Reg. No. : | | | | | | | | | | | | |

Question Paper Code : 20359

B.E./B.Tech. DEGREE EXAMINATION, NOVEMBER/DECEMBER 2018.

Third/Fifth/Eighth Semester

Computer Science and Engineering

CS 6302 – DATABASE MANAGEMENT SYSTEMS

(Common to Mechanical and Automation Engineering, Mechatronics Engineering and Information Technology)

(Regulations 2013)

(Also common PTCS 6302 – Database Management System for B.E. (Part-Time) Second Semester – Computer Science and Engineering – Regulations 2014)

Time : Three hours Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. Mention some of the major responsibilities of a database administrator.

2. Give an example for one to one and one to many relationships.

3. What are aggregate functions? And list the aggregate functions supported by SQL?

4. Write a SQL statement to find the names and loan numbers of all customers who have a loan at XYZ branch.

5. Highlight the role of a recovery management component.

6. Give the drawbacks of shadow-paging technique.

7. Why is a B+- tree usually preferred as an access structure to a data file?

8. What are the ways in which the variable-length records represented in database systems?

9. How are transactions performed in Object oriented database?

10. How spatial databases are more helpful than active database?

PART B — (5 × 13 = 65 marks)

11. (a) Construct an E-R diagram for a car-insurance company whose customers own one or more cars each. Each car has associated with it zero to any number of recorded accidents. State any assumptions you make.

Or

(b) Suppose that we have the following three tuples in a legal instance of a relation schema S with three attributes ABC (listed in order): (1,2,3), (4,2,3), and (5,3,3).

(i) Which of the following dependencies can you infer does not hold over, schema S?

(1) $A \rightarrow B$ (2) $BC \rightarrow A$ (3) $B \rightarrow C$.

(ii) Can you identify any dependencies that hold over S?

12. (a) Consider the following relational schema:

Employee (empno, name, office, age)

Books (isbn, title, authors, publisher)

Loan (empno isbn, date)

Write the following queries in relational algebra.

(i) Find the names of employees who have borrowed a book Published by XYZ Ltd.,

(ii) Find the names of employees who have borrowed all books Published by XYZ Ltd.,

(iii) Find the names of employees who have borrowed more than five different books published by XYZ Ltd.,

(iv) For each Publisher, find the names of employees who have borrowed more than five books of that Publisher.

Or

(b) (i) Since indices speed query processing why might they not be kept on several search keys? List as many reasons as Possible.

(ii) How does a DBMS represent a relational query evaluation plan?

13. (a) Explain the methods used to handle Deadlock.

Or

(b) (i) Differentiate strict two phase locking protocol and rigorous two phase locking protocol. (6)

(ii) How the time stamps are implemented? Explain. (7)

14. (a) (i) Explain why allocations of records to blocks affect database system performance significantly. (5)

(ii) Explain the concept of Deadlock avoidance and prevention in detail. (8)

Or

(b) (i) Explain how reliability can be improved through redundancy? (6)

(ii) How the records are represented and organized in files. Explain with suitable example. (7)

15. (a) Discuss the issues and steps involved in building a data warehouse. How the concept of relational view is related to data warehouse and data marts?

Or

(b) (i) Compare and contrast between object oriented and XML databases. (7)

(ii) Give XML representation of bank management system and also explain about Document Type Definition and XML schema. (6)

PART C — (1 × 15 = 15 marks)

16. (a) Given: VAR Exam_Marks BASE RELATION { Student_ID SID, Course_ID CID, Mark INTEGER} KEY {Student ID, Course ID};

Write down the relational algebra expression to give, for each pair of students sitting in the same exam, the absolute value of difference between the marks. Assume you can write ABS (x) to obtain the absolute value of x.

Or

(b) Give an example of a relation that is in 3NF but not in BCNF. How will you convert that relation into BCNF.

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Question Paper Code : 50383

B.E./B.Tech. DEGREE EXAMINATION, NOVEMBER/DECEMBER 2017

Third/Fifth/Eighth Semester

Computer Science and Engineering

CS 6302 – DATABASE MANAGEMENT SYSTEMS

(Common to Mechanical and Automation Engineering, Mechatronics Engineering, Information Technology)

(Regulations 2013)

me : Three Hours | Maximum : 100 Marks

Answer ALL questions

PART – A (10×2=20 Marks)

1. State the levels of abstraction in a DBMS.
2. What are the problems caused by redundancy ?
3. What is static SQL and how is it different from dynamic SQL ?
4. State the steps in query processing.
5. State need for concurrency.
6. Define ACID properties.
7. What are data fragmentations ? State the various fragmentations with example.
8. Define ordered indices with example.
9. Distinguish between threats and risks.
10. State the function of XML schema.

PART – B (5×13=65 Marks)

11. a) i) Differentiate between foreign key constraints and referential integrity constraints with suitable example. (6)

ii) Distinguish between lossless-join decomposition and dependency preserving decomposition. (7)

(OR)

b) State and explain the architecture of DBMS. Draw the ER diagram for banking systems. (Home loan applications). (13)

12. a) i) State and explain the command DDL, DML, DCL with suitable example. (7)

ii) Justify the need of embedded SQL. Consider the relation student (studentno, name, mark and grade). Write embedded dynamic SQL statements in C language to retrieve all the students' records whose mark is more than 90. (6)

(OR)

b) Explain the catalog information for cost estimation for selection and sorting operation in database. (13)

13. a) State and explain the lock based concurrency control with suitable example. (13)

(OR)

b) When does deadlock occurs ? Explain two-phase commit protocol with example. (13)

14. a) i) What are the various feature of distributed database versus centralized database system ? (6)

ii) Explain the B+ tree indexes on multiple keys with a suitable example. (7)

(OR)

b) Explain the distinction between static and dynamic hashing. Discuss the relative merits of each technique in database applications. (13)

15. a) i) Distinguish between classification and clustering with example. (7)

ii) State the necessity for crawling and indexing the web. Explain the procedure for it. (8)

(OR)

b) Describe the various component of data warehouse and explain the different data model used to store data with example. (13)

PART – C (1×15=15 Marks)

16. a) Explain in detail about spatial and multimedia databases. (15)

(OR)

b) Write the DDL, DML, DCL commands for the students database.
Which contains student details : name, id, DOB, branch, DOJ.
Course details : Course name, Course id, Stud. id, Faculty name, id, marks. (15)

12. a) Illustrate the division algorithm with an example. (13

(OR)

b) i) Add the numbers $(0.5)_{10}$ and $(0.4375)_{10}$ using the floating point addition. (6½

ii) Multiply the numbers $(0.5)_{10}$ and $(0.4375)_{10}$ using the floating point multiplication. (6½

13. a) Explain in detail the operation of the data path. (13

(OR)

b) Explain the pipeline hazard in detail. (13

14. a) Explain with diagrammatic illustration Flynn's classification. (13

(OR)

b) Describe Simultaneous Multithreading (SMT) with an example. (13

15. a) Explain in detail about the memory technologies. (13

(OR)

b) What is cache memory ? How to improve cache performance ? Discuss. (13

PART – C (1×15=15 Mark

16. a) i) Suppose you want to achieve a speed-up of 90 times faster with 100 processors. What percentage of the original computation can be sequential ? (

ii) Suppose you want to perform two sums : one is a sum of 10 scalar variables and one is a matrix sum of a pair of two-dimensional arrays, with dimensions 10 by 10. For now let's assume only the matrix sum is parallelizable; we'll see soon how to parallelize scalar sums. What speed-up do you get with 10 versus 40 processors ? Next, calculate the speed-ups assuming the matrices grow to 20 by 20. (

(OR)

b) Assume the miss rate of an instruction cache is 2% and the miss rate of the data cache is 4%. If a processor has a CPI of 2 without any memory stalls and the miss penalty is 100 cycles for all misses, determine how much faster a processor would run with a perfect cache that never missed. Assume the frequency of all loads and stores is 36%. (1

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Question Paper Code : 52857

CSE

B.E./B.Tech. DEGREE EXAMINATIONS, APRIL/MAY 2019.

Third Semester

Computer Science and Engineering

CS 6301 – PROGRAMMING AND DATA STRUCTURES – II

(Common to: Information and Technology)

(Regulation 2013)

(Also common to PTCS 6301 – Programming and Data Structures II for B.E. Part-time - Second Semester – Computer science and Engineering –Regulation 2014)

Time : Three hours Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. Define an object. Give an example.
2. What is '*this*' pointer in C++?
3. State the use of operators 'new' and 'delete' in C++.
4. Define inheritance. Give its types.
5. What is an abstract class? Give an example.
6. What is an exception Handling. Give an example.
7. What is a nonlinear data structure? Give an example.
8. What are disjoint sets? Give an example.
9. Define Euler path and Euler circuit of a graph.
10. What is a minimal spanning tree? Give an example.

PART B — (5 × 13 = 65 marks)

11. (a) (i) Outline abstraction and encapsulation with an example. (6)

(ii) Explain the storage classes in C++. (7)

Or

(b) (i) Write a C++ program to print the first 'n' prime numbers. (6)

(ii) Write a C++ program to accept a square matrix, find the transpose and print the result. Use classes and member functions. (7)

12. (a) Write a C++ program to sort an array of 'N' names in alphabetic order. (13)

Or

(b) (i) Explain dynamic memory allocation in C++ with code snippets. (7)

(ii) What is polymorphism? Outline compile time polymorphism and runtime polymorphism with an example. (6)

13. (a) Explain exception handling in C++ with an example. (13)

Or

(b) What is a template? Explain class template and function template with C++ code. (13)

14. (a) What is an AVL tree? Illustrate the steps in the algorithm for inserting a node into an AVL tree with an example. (13)

Or

(b) What is a splay tree? Illustrate the steps in the algorithm for deleting a node from a splay tree with an example. (13)

15. (a) Explain the algorithm for breadth-first search traversal of a graph with an example. (13)

Or

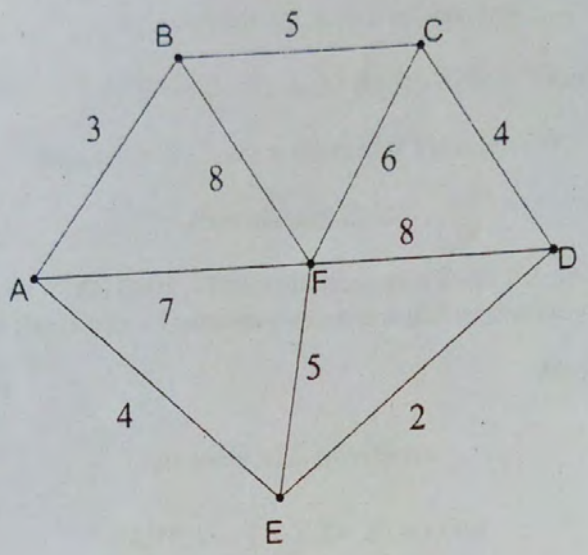
(b) Outline the steps in the Dijkstra's single-source shortest path algorithm with an example. (13)

PART C — (1 × 15 = 15 marks)

16. (a) Construct a B - tree of order 5 for the following key values: 1, 12, 8, 2, 25, 6, 14, 28, 17, 7, 52, 16, 48, 68, 3, 26, 29, 53, 55 arid 45. Illustrate the tree construction process step by step. (15)

Or

(b) Apply the Kruskal's algorithm to find the minimal spanning tree for the following graph: (15)



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Question Paper Code : 40900

B.E./B.Tech. DEGREE EXAMINATION, APRIL/MAY 2018

Third Semester

Computer Science and Engineering

CS6301 – PROGRAMMING AND DATA STRUCTURES – II

(Common to Information Technology)

(Regulations 2013)

Time : Three Hours

Maximum : 100 Marks

Answer ALL questions

PART – A (10×2=20 Marks)

1. What are the concepts in C++ that makes it Object Oriented ?
2. Write the syntax and uses of 'this pointer'.
3. Can we make a class constructor *virtual* in C++ to create polymorphic objects ?
4. How to allocate and deallocate dynamic memory ?
5. What are the main advantages of exception handling over traditional error handling ?
6. Write a sample for arithmetic binary functions.
7. Give examples for linear and non linear data structures.
8. State the Heap Order Property.
9. What are the representation of graphs ?
10. What are the applications of graph algorithms ?

PART – B (5×13=65 Marks)

11. a) Write code in C++ to show that static members are shared among all objects. And explain. (13)

(OR)

b) i) Consider pointer notation for the two-dimensional numeric arrays and with the following declaration fill up the table below for all values in 2D array. **(7+6)**

int nums [2] [3] = { {16, 18, 20}, {25, 26, 27} };

Pointer notation	Array notation	Value
....	....	....

ii) Write the output of the following program.

```
int main ( )
{
    char arr [5] [7] [6];
    char (*p) [5] [7] [6]  = &arr;
    printf ("%d\n", (&arr + 1) – &arr);
    printf ("%d\n", (char*) (&arr + 1) – (char*) &arr);
    printf ("%d\n", (unsigned) (arr + 1) – (unsigned) arr);
    printf ("%d\n", (unsigned) (p + 1) – (unsigned)p);
    return 0;
}
```

12. a) Write minimum of 30 overloaded operators and all the non-overloaded operators in C++ and write C++ code to overload post and pre increment operators. **(5+8)**

(OR)

b) Explain Dynamic Memory Allocation in C++ with examples for arrays and objects. **(13)**

13. a) List standard exceptions in C++ and show how to define user defined exception with suitable example. **(6+7)**

(OR)

b) List the functions used with STL Lists. And use these functions to demonstrate STL list. **(6+7)**

14. a) Explain amortized analysis and its types in detail. **(13)**

(OR)

b) Write pseudocode to perform rotation operation in splay tree. **(13)**

15. a) Write Kruskal's and Prim's (starts at F) Minimum Spanning Tree Algorithm and apply both techniques on the graph given below in Fig. 1. Can Prim's and Kruskal's algorithm yield different minimum spanning trees ? Explain why or why not. (13)

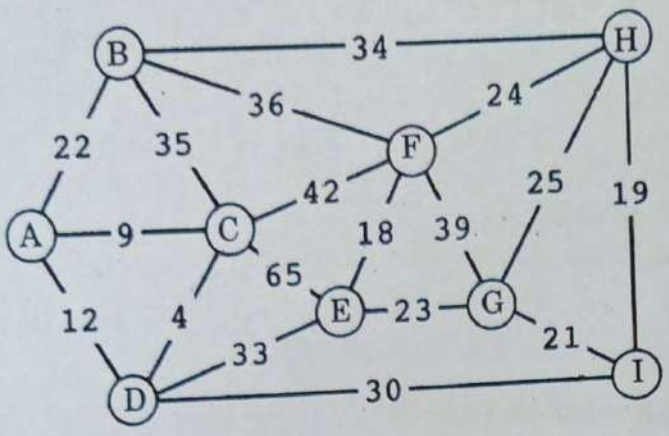

Fig. 1

(OR)

b) Write algorithm to find shortest path using Dijkstra's method and apply the same to estimate shortest path from the graph given in Fig. 2. (13)

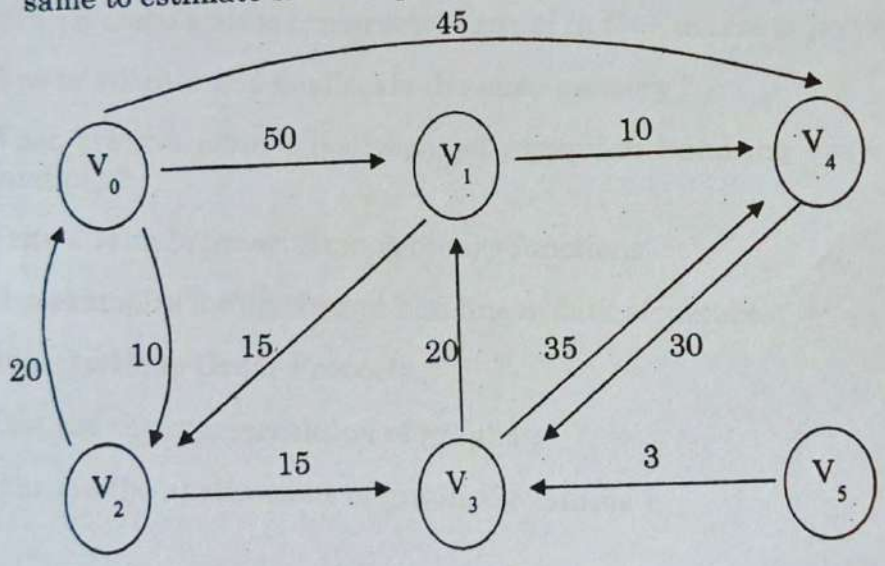

Fig. 2

PART – C (1×15=15 Marks)

16. a) Write generic code in C++ to implement AVL tree insertion. And show the result of inserting 2, 1, 4, 5, 9, 3, 6, 7 into an initially empty AVL tree. (10+5)

(OR)

b) Write a C++ code using function with multiple parametrs to perform recursive binary search on a linear array. (15)

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Question Paper Code : 71673

B.E./B.Tech. DEGREE EXAMINATION, APRIL/MAY 2017.

Third Semester

Computer Science and Engineering

CS 6301 — PROGRAMMING AND DATA STRUCTURE

(Common to Information Technology)

(Regulations 2013)

Time : Three hours Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. List the features of Object Oriented C++ programming.
2. What is the role of 'this' pointer.
3. Define multiple inheritance, Give example.
4. List different operators of C++ that can be overloaded. Give one example.
5. Define abstract class. Give example.
6. State the uses of templates in C++ programming.
7. Define Balance Factor of AVL Tree.
8. List the properties of Red Black Tree.
9. State the principle of Topological Sorting.
10. Write procedure for Depth First search algorithm.

PART B — (5 × 13 = 65 marks)

11. (a) Define class and object. Explain different types of constructors using C++ Program.

Or

(b) Explain the different types of storage classes of C++ using suitable examples.

12. (a) Demonstrate the following string operations using C++ program - (i) finding the length of string (ii) finding the substring from the string (iii) replace a given substring in a string (iv) concatenate two strings (v) compare two strings (vi) insert a substring in a given string.

Or

(b) Assume the classes Person Student and PartTimeStudent are inherited from one another. Define classes with suitable data members (common and special attributes) and methods using C++ program to demonstrate the types of inheritance.

13. (a) (i) Define STL. Explain its key components and types. (5)

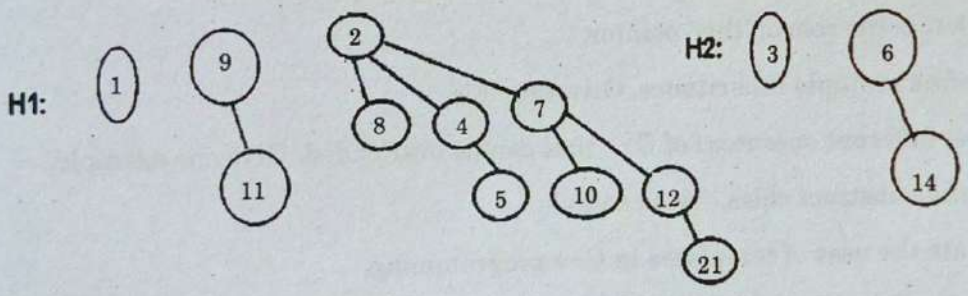
(ii) Write C++ code using function template to sort the items of an array. (8)

Or

(b) (i) Write C++ file handling routine to copy one content of file into another file. (7)

(ii) Explain the use of exception handling in C++ with suitable example. (6)

14. (a) (i) Merge the given Binomial heaps. Write procedure for merge operation. (5+3)



(ii) Delete three elements from the merged Binomial Queue. (5)

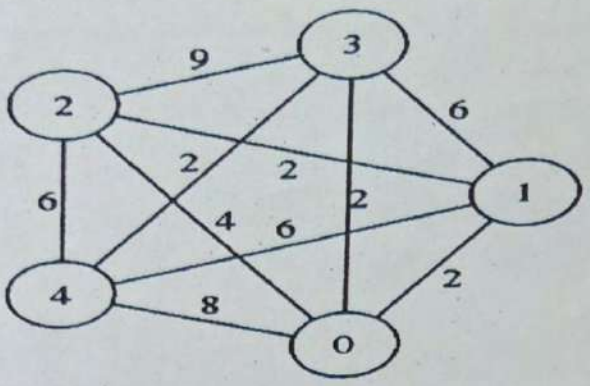
Or

(b) (i) Draw B-tree of order m = 5 for the keys {K, O, S, V, M, F, B, G, T, U, W}. (6)

(ii) Delete the keys K and G in order. (4)

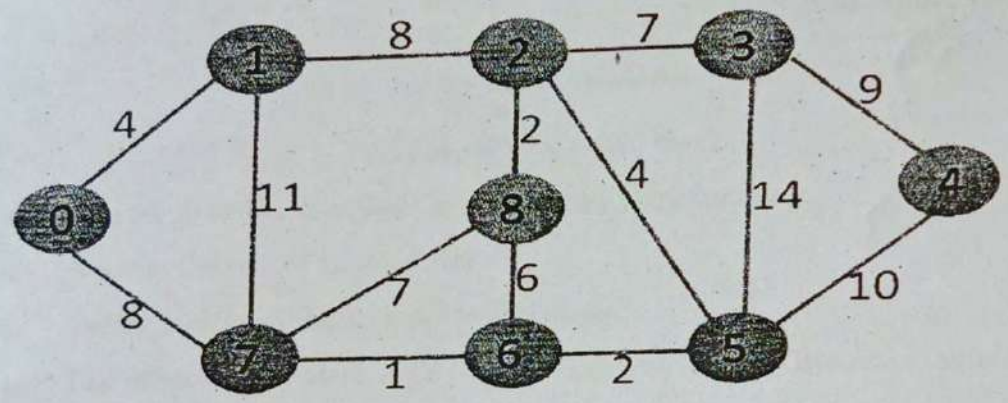
(iii) Justify the number of splits needed for insert/delete with proper reasons. (3)

15. (a) Consider the following graph. Determine the shortest distance to all other nodes using Dijikstra's algorithm. Write Procedure: (10+3)



Or

(b) Determine the minimum spanning tree of a given Graph using Kruskal's algorithm. Write Kruskal's MST algorithm. (10+3)



PART C — (1 × 15 = 15 marks)

16. (a) Assume the following keys form the Binary Search tree {50, 30, 60, 40, 35, 80, 90}. Analyze the time complexity involved in searching the keys 90 and then 80, when the given BST is converted into AVL or Splay tree. Identify the suitable tree data structure for representing this data and justify your answer with valid reasons.

Or

(b) The Manager class is derived from Employee class. Use C++ virtual function to calculate salary of Employee/Manager class. Increments for employees differ based on their category. Assume suitable common and special attributes for the classes. Implement this scenario using C++ code to calculate the monthly and annual payment of each employee category.

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Question Paper Code : 91392

B.E./B.Tech. DEGREE EXAMINATIONS, NOVEMBER/DECEMBER 2019

Third Semester

Computer Science and Engineering

CS 6301 – PROGRAMMING AND DATA STRUCTURES – II

(Common to Information Technology)

(Regulations 2013)

(Also common to PTCS 6301 – Programming and Data Structures – II for B.E. (Part-Time) – Second Semester – Computer Science and Engineering – Regulations – 2014)

Time : Three Hours

Maximum : 100 Marks

Answer ALL questions

PART – A

(10×2=20 Marks)

1. Write the differences between C and C++ programming language.
2. Compare C++ reference variables with C++ pointers.
3. Outline the role of copy constructors in C++.
4. Explain the dynamic memory allocation operators of C++.
5. Identify the standard header files used for I/O operations in C++.
6. Write in brief about the keywords used in C++ exception handling.
7. Illustrate the purpose of amortized analysis.
8. Define Disjoint-set data structure.
9. Define indegree and outdegree of a directed graph.
10. Write short notes on Kruskal's Algorithm.

PART – B

(5×13 = 65 Marks)

11. a) i) Explain the different types of storage classes of C++ using a simple program. **(4+4)**

ii) State the use of 'this' pointer and demonstrate it using a simple C++ program. **(2+3)**

(OR)

b) i) Define Constructor in C++ class. Explain how it differs from normal member functions. Differentiate default and parameterized constructors using a simple C++ program. (2+2+3+3)

ii) Define Destructor of C++ class. List the various cases, when does destructor being called in a C++ program (3)

12. a) i) Describe function overloading and demonstrate it using a suitable C++ program (4+6)

ii) Differentiate compile and runtime polymorphism. (3)

(OR)

b) i) Explain operator overloading and demonstrate it using a suitable C++ program. (4+6)

ii) Discuss the use of "nested classes" using C++ program. (3)

13. a) i) Define templates used in C++ language. Explain the syntax and the role of function and class templates using a C++ program. (2+4+4)

ii) Discuss the use of "abstract class" using C++ program. (3)

(OR)

b) i) Demonstrate exception handling with multiple catch blocks using C++ program. (6)

ii) Write file handling routines to copy one file content into another file. (7)

14. a) i) Insert the following keys 10, 20,15, 45, 60 and 5 into an empty AVL tree one by one. (7)

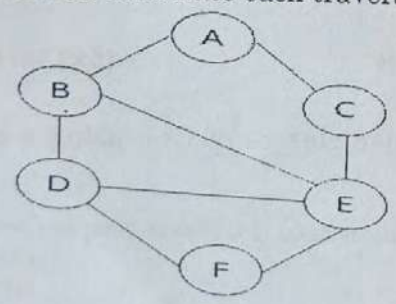
ii) Insert the keys 1,10, 2, 9 and 3 into empty Splay tree. (6)

(OR)

b) i) Write the properties of B-tree. (3)

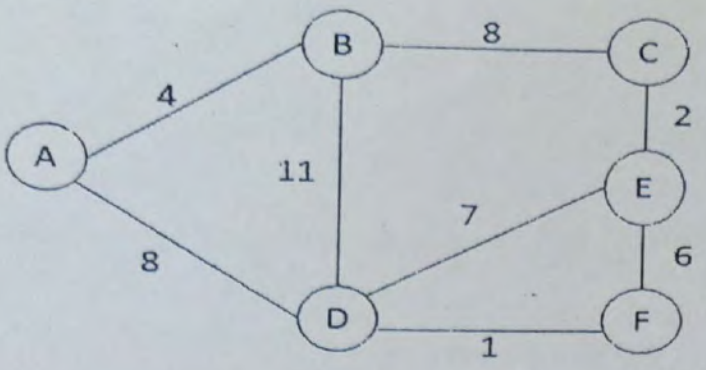
ii) Insert the keys 1 – 10 into B-tree of order 3. Delete the key 10. (10)

15. a) Perform depth first search and breadth first search for the given graph. Write procedures. Illustrate each traversal using stack or queue. (5+5+3)



(OR)

b) Apply Prim's Algorithm to find the minimum spanning tree. Write procedure. **(10+3)**

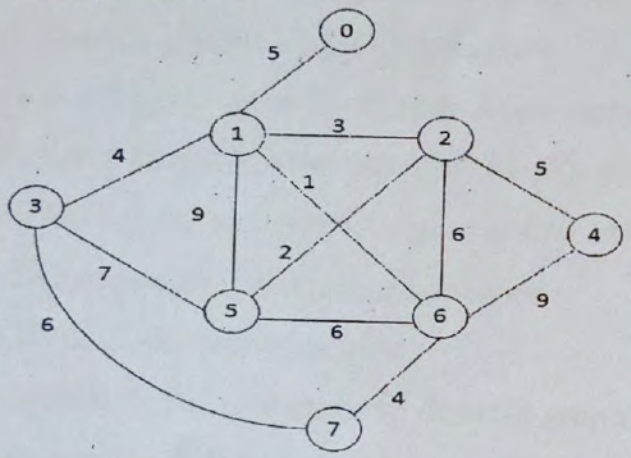


PART – C **(1×15 = 15 Marks)**

16. a) Write a C++ program to implement the following. Let Employee be a parent class and Manager and Clerk derived from this class. Use virtual function calculatePay( ) appropriately such that the C++ program calculates payment for manager and clerk separately. Make necessary assumptions for calculation of salary/pay. **(15)**

(OR)

b) Apply Dijikstra's shortest path algorithm for the given graph from the vertex 0. Write procedure. **(10+5)**



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Question Paper Code : 20358

B.E./B.Tech. DEGREE EXAMINATION, NOVEMBER/DECEMBER 2018

Third Semester

Computer Science and Engineering

CS 6301 — PROGRAMMING AND DATA STRUCTURES – II

(Common to Information Technology)

(Regulations 2013)

(Also common to PTCS 6301 – Programming and Data Structures II for B.E. (Part-Time) Second Semester – Computer Science and Engineering – Regulations 2014)

Time : Three hours

Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. Define a class.
2. Outline the role of 'this' pointer.
3. What is a copy constructor?
4. Name the operators that cannot be overloaded in C++.
5. Define an abstract class.
6. What is an exception? Give an example.
7. What is an AVL tree?
8. Outline the properties of a red-black tree?
9. What is an undirected graph? Give an example.
10. How a directed graph can be represented as an adjacency matrix? Give an example.

PART B — (5 × 13 = 65 marks)

11. (a) (i) Explain data abstraction and data encapsulation with examples. (7)

(ii) Write a C++ program to perform computation of $sin\ (x)$ as given below. (6)

$$\sin x = x - \frac{x^3}{3!} + \frac{x^5}{5!} - \frac{x^7}{7!} + \frac{x^9}{9!} \ldots\ldots\ldots N \text{ terms.}$$

Or

(b) Write a C++ program to accept two square matrices, add the same and print the result. Use classes and member functions. (13)

12. (a) (i) What is polymorphism? Discuss compile time and run time polymorphism with examples. (7)

(ii) Illustrate dynamic memory allocation in C++ by giving suitable examples. (6)

Or

(b) Describe inheritance in C++. Discuss various types of inheritance in C++ by writing suitable programs. (13)

13. (a) What is a template? Outline the need for templates in C++. Give examples for different types of templates in C++. (13)

Or

(b) Write a C++ program to copy the contents of one file to another. (13)

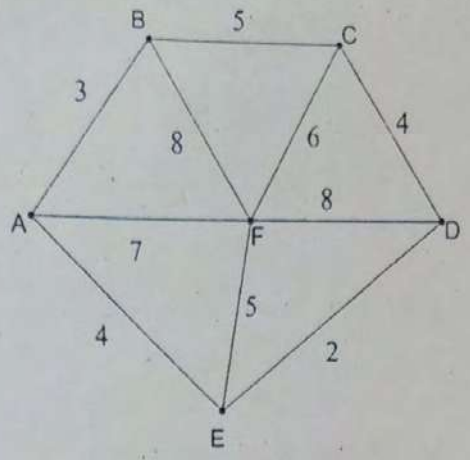
14. (a) Construct a B – tree of order 5 for the following key values: 1, 12, 8, 2, 25, 6, 14, 28, 17, 7, 52, 16, 48, 68, 3, 26, 29, 53, 55 and 45. Illustrate the tree construction process step by step. (13)

Or

(b) (i) Write algorithms for arbitrary and smart unions for disjoint set ADT. (5)

(ii) Discuss the three methods of amortized analysis with an example. (8)

15. (a) What is a minimum spanning tree? A cable company wants to connect five villages to their network as illustrated in the diagram below:



Using Prim's algorithm find the minimum length of cable needed. (13)

Or

(b) State the single-source shortest path problem and illustrate Dijkstra's algorithm with an example. (13)

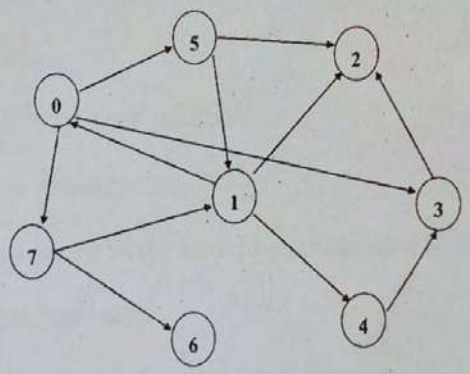
PART C — (1 × 15 = 15 marks)

16. (a) Construct a max heap and min heap by inserting the following elements:

10, 14, 9, 8, 7, 3, 12, 15, 17. Show the heap structure and array representation in each step. (15)

Or

(b) Outline the breadth first traversal algorithm for a graph and apply the breadth first traversal algorithm to the following directed graph:



Start with node 5 and illustrate the traversal process step by step. (15)

Reg. No. : | | | | | | | | | | | | |

Question Paper Code : 50382

B.E./B.Tech. DEGREE EXAMINATION, NOVEMBER/DECEMBER 2017

Third Semester

Computer Science and Engineering

CS 6301 – PROGRAMMING AND DATA STRUCTURES – II

(Common to : Information Technology)

(Regulations 2013)

Time : Three Hours | Maximum : 100 Marks

Codes/Tables/Charts to be permitted, if any may be indicated.

Answer ALL questions

PART – A (10×2=20 Marks)

1. Define Encapsulation. How is it implemented in C++ language.
2. Write *call by reference* in C++ with suitable example.
3. Write C++ code snippet to copy string s1 into another string s2.
4. Write about the nested classes with example using C++.
5. List differences between *abstract class* and *abstract method.*
6. Define STL of C++ programming.
7. List differences between AVL tree and Splay tree.
8. Draw Binomial Heap representation for number of nodes n = 7 and give a brief note on it.
9. Define Graph data structure.
10. State the use of Floyd Warshall Algorithm.

PART – B (5×13=65 Marks)

11. a) i) List properties of Constructor. (2)
    ii) Explain different types of constructors used in C++ language. (3)
    iii) Write a C++ program to calculate the volume of cube using different types of constructor. (8)

    (OR)

    b) i) Explain **static** data and **static** function of C++ with suitable examples. (4+4)
    ii) Demonstrate the use of **this** pointer with suitable example. (5)

12. a) i) Demonstrate the use of function overloading in C++. (3)
ii) List rules for operator overloading in C++. (3)
iii) Write C++ program to overload + operator. (7)

(OR)

b) Write a C++ program to create a class **Employee** and include two derived classes called **Manager** and **Clerk**. Add appropriate data members and member functions and explain the concept of inheritance using this example. Assume Clerk and Manager have different pay schemes. Write suitable member functions to calculate pay of each employee of type Clerk and Manager. **(3+3+3+4)**

13. a) i) Write the uses of Exception handling. (2)
ii) Explain different keywords used in Exception handling. (3)
iii) Demonstrate the use of exception handling in C++ language. (8)

(OR)

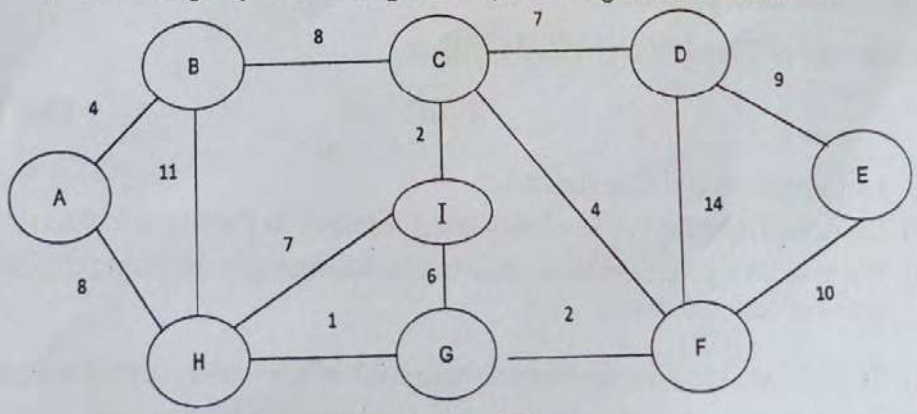
b) i) Write C++ file handling routine to copy one content of file into another file. (6)
ii) Demonstrate the use of Runtime polymorphism in C++ language. (7)

14. a) i) Define Balance Factor of AVL Tree. (2)
ii) Insert the following keys into empty AVL tree one by one
44, 30, 76, 16, 39, 37. (8)
iii) Write procedure for single and/or double rotations. (3)

(OR)

b) i) Write the properties of B-tree. (2)
ii) Construct B-tree of order m = 5 for the following keys.
1 12 8 2 25 5 14 28 17 7 52 16 48 68 3 26 29 53 55 45 (8)
iii) Delete the keys 8 and 55. State the rules for deletion. (3)

15. a) i) Write procedure of Dijikstra's Algorithm. (4)
ii) Consider the given graph. Determine the shortest distance to all other nodes using Dijikstra's algorithm, starting at the vertex A. (9)



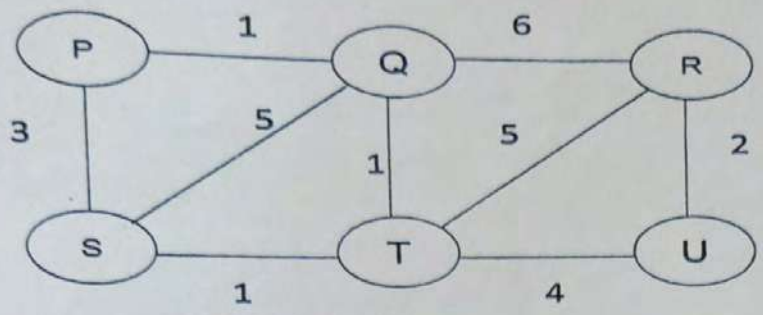
Dijikstra's Algorithm

(OR)

b) i) Define Minimum Spanning Tree (MST). (2)

ii) For the given graph, use Kruskal's algorithm to determine the MST. (8)

iii) Evaluate the cost of MST. Write procedure(s). (3)



Prim's Algorithm

PART – C (1×15=15 Marks)

16. a) Write C++ programs.

i) Use function template to determine maximum of two values. (7)

ii) Use class template to implement generic methods of stack (push and pop). (8)

OR

b) Identify the suitable tree data structure for representing data {50, 30, 60, 40, 35, 80, 90} so that the time complexity involved in searching the key should be minimum. Try three different nonlinear data structures and give diagrammatic representation of data. The data size may grow in future and may take any value. Justify your answer with valid reasons. (5+5+5)

Reg. No. : | | | | | | | | | | | | |

Question Paper Code : 91398

B.E./B.Tech. DEGREE EXAMINATIONS, NOVEMBER/DECEMBER 2019

Third/Fourth Semester

Computer Science and Engineering

CS 6402 – DESIGN AND ANALYSIS OF ALGORITHMS

(Common to Information Technology)

(Regulations 2013)

Time : Three Hours | Maximum : 100 Marks

Answer ALL questions

PART – A **(10×2=20 Marks)**

1. The (log n)th smallest number of n unsorted numbers can be determined in O(n) average-case time (True/False).
2. Write the recursive Fibonacci algorithm and its recurrence relation.
3. Design a brute-force algorithm for computing the value of a polynomial $p(x) = a_n x^n + a_{n-1} x^{n-1} + \Lambda + a_1 x \Lambda a_0$ at a given point x_0 and determine its worst-case efficiency class.
4. Derive the complexity of Binary Search algorithm.
5. Define the Single Source Shortest Paths Problem.
6. State the assignment problem.
7. What do you mean by 'perfect matching' in bipartite graphs ?
8. State Planar coloring graph problem.
9. Write the formula for decision tree for searching a sorted array.
10. State the reason for terminating search path at the current node in branch and bound algorithm.

PART – B (5×13=65 Marks)

11. a) If you have to solve the searching problem for a list of n numbers, how can you take advantage of the fact that the list is known to be sorted ? Give separate answers for

i) Lists represented as arrays. (4)

ii) Lists represented as linked lists. (4)

Compare the time complexities involved in the analysis of both the algorithms. (5)

(OR)

b) i) Derive the worst case analysis of Merge Sort using suitable illustrations. (6)

ii) Derive a loose bound on the following equation : (7)

$f(x) = 35x^8 - 22x^7 + 14x^5 - 2x^4 - 4x^2 + x - 15.$

12. a) State and explain the Merge Sort algorithm and give the recurrence relation and efficiency. (13)

(OR)

b) Explain the method used for performing multiplication of two large integers. Explain how Divide Conquer method can be used to solve the same. (13)

13. a) i) The binary string below is the title of a song encoded using Huffman codes.

0011000101111101100111011101100000100111010010101.

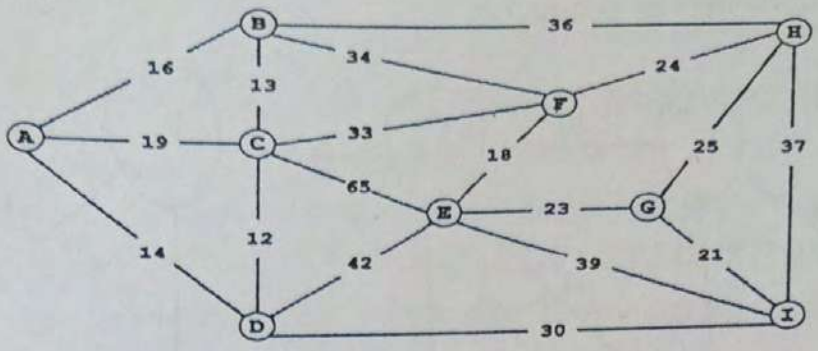
Give the letter frequencies listed in the table below, build the Huffman codes and use them to decode the title. In cases where there are multiple "greedy" choices, the codes are assembled by combining the first letters (or groups of letters) from left to right, in the order given in the table. Also, the codes are assigned by labeling the left and right branches of the prefix/code tree with '0' and '1', respectively. (7)

Letter	a	h	v	w	' '	e	t	l	o
Frequency	1	1	1	1	2	2	2	3	3

ii) Write the procedure to compute Huffman code. (6)

(OR)

b) Consider the following weighted graph. (13)



Give the list of edges in the MST in the order that Prim's algorithm inserts them. Start Prim's algorithm from vertex A.

14. a) Describe in detail the simplex algorithm methods.

(OR)

b) Explain KMP string matching algorithm for finding a pattern on a text and analyze the algorithm.

15. a) i) Draw a decision tree and find the number of key comparisons in the worst and average cases for the three-element bubble sort. (7)

ii) Write backtracking algorithm for 4-Queen's problem and discuss the possible solution. (6)

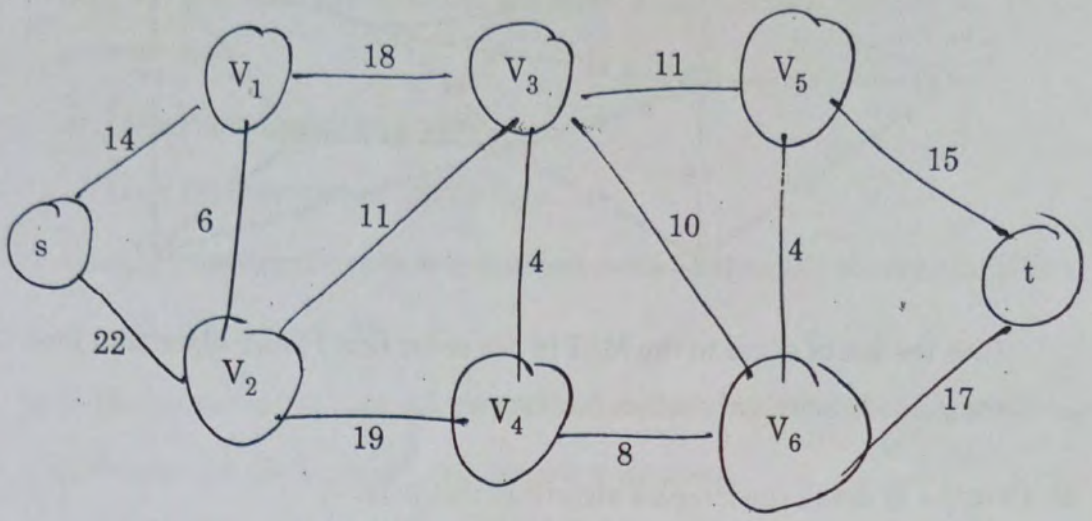
(OR)

b) Solve the following instance of Knapsack problem by branch and bound algorithm. (13)

Item	Weight	Profit	
1	5	$40	
2	7	$35	
3	2	$18	W = 15
4	4	$4	
5	5	$10	
6	1	$2	

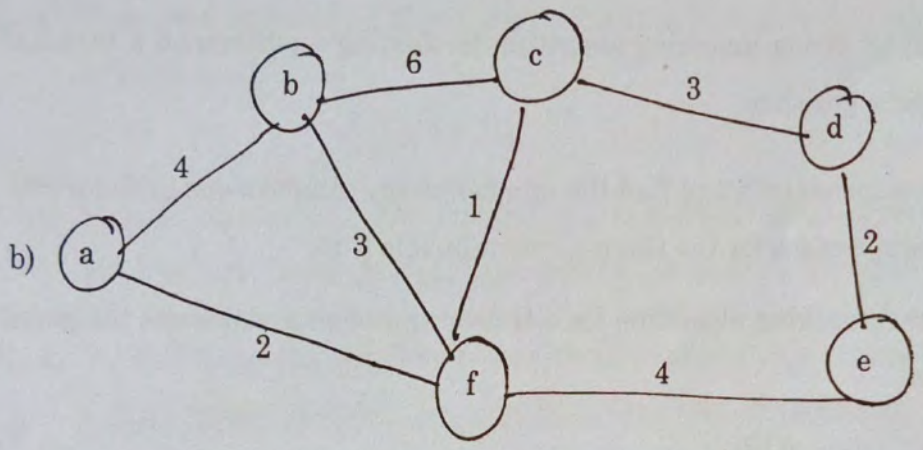
PART – C (1×15=15 Marks)

16. a) Use Dijkstra's algorithm to find the shortest path for the following graph with s as source and t as destination. (15)



(OR)

b)



Apply Prim's and Kruskal's algorithm for the above graph and find the minimum spanning tree. (15)

Reg. No. : | | | | | | | | | | | | |

Question Paper Code : 71679

B.E./B.Tech. DEGREE EXAMINATION, APRIL/MAY 2017.

Third/Fourth Semester

Computer Science and Engineering

CS 6402 — DESIGN AND ANALYSIS OF ALGORITHMS

(Common to information Technology)

(Regulations 2013)

Time : Three hours Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. What is an Algorithm?

2. Write an algorithm to compute the greatest common divisor of two numbers.

3. Devise an algorithm to make for 1655 using the Greedy strategy. The coins available are {1000, 500, 100, 50, 20, 10, 5}.

4. What is closest-pair problem?

5. State the general principle of greedy algorithm.

6. What do you mean by dynamic programming?

7. What do you mean by 'perfect matching' in bipartite graphs?

8. State: Planar coloring graph problem.

9. What is an articulation point in a graph?

10. Define 'P' and 'NP' problems.

PART B — (5 × 13 = 65 marks)

11. (a) Briefly explain the mathematical analysis of recursive and non-recursive algorithm. (13)

Or

(b) Explain briefly Big oh Notation, Omega Notation and Theta Notations. Give examples. (13)

12. (a) What is divide and conquer strategy and explain the binary search with suitable example problem. (13)

Or

(b) Solve the following using Brute-Force algorithm: (13)

Find whether the given string follows the specified pattern and return 0 or 1 accordingly.

Examples :

(i) Pattern: "abba", input: "redblueredblue" should return 1

(ii) Pattern: "aaaa", input: "asdasdasdasd" should return 1

(iii) Pattern: "aabb" input: "xyzabcxzyabc" should return 0.

13. (a) Solve the following instance of the 0 / 1, knapsack problem given the knapsack capacity in $W = 5$ using dynamic programming and explain it. (13)

Items	Weight	Value
1	4	10
2	3	20
3	2	15
4	5	25

Or

(b) Write the Huffman's Algorithm. Construct the Huffman's tree for the following data and obtain its Huffman's Code. (13)

Character	A	B	C	D	E	–
Probability	0.5	0.35	0.5	0.1	0.4	0.2

14. (a) Describe in detail the simplex algorithm methods. (13)

Or

(b) Explain KMP string matching algorithm for finding a pattern on a text, and analyze the algorithm. (13)

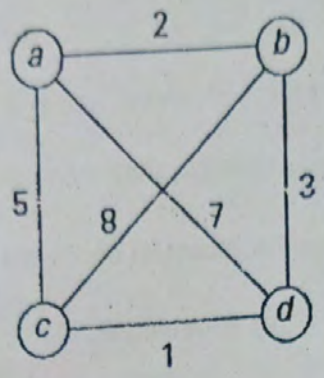
15. (a) Discuss the approximation algorithm for NP- hard problems. (13)

Or

(b) Describe the backtracking solution to solve 8-queens problem. (13)

PART C — (1 × 15 = 15 marks)

16. (a) Apply Branch and Bound algorithm to solve the Travelling Salesman Problem for (15)



Or

(b) Write an algorithm for quick sort and write its time complexity with example list are 5, 3, 1, 9, 8, 2, 4, 7. (15)

Reg. No. : | | | | | | | | | | | | |

Question Paper Code : 40906

B.E./B.Tech. DEGREE EXAMINATION, APRIL/MAY 2018
Third/Fourth Semester
Computer Science and Engineering
CS 6402 – DESIGN AND ANALYSIS OF ALGORITHMS
(Common to : Information Technology)
(Regulations 2013)

Time : Three Hours | Maximum : 100 Marks

Answer ALL questions

PART – A (10×2=20 Marks)

1. Give the Euclid's algorithm for computing gcd of two numbers.
2. What is a basic operation ?
3. What is an exhaustive search ?
4. State Master's theorem.
5. Define transitive closure of a directed graph.
6. Define the minimum spanning tree problem.
7. How is a transportation network represented ?
8. What is meant by maximum cardinality matching ?
9. How is lower bound found by problem reduction ?
10. What are tractable and non-tractable problems ?

PART – B (5×13=65 Marks)

11. a) Define Big O notation, Big Omega and Big Theta Notation. Depict the same graphically and explain.

(OR)

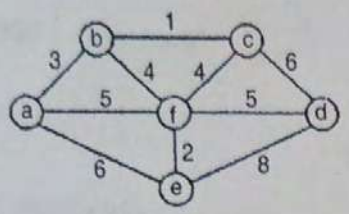
b) Give the General Plan for Analyzing the Time Efficiency of Recursive Algorithms and use recurrence to find number of moves for Towers of Hanoi problem.

12. a) Explain Merge sort algorithm with an example.

(OR)

b) Explain the working of Strassen's Matrix Multiplication with the help of divide and conquer method.

13. a) Give the Pseudo code for Prim's algorithm and apply the same to find the minimum spanning tree of the graph shown below :



(OR)

b) Explain the memory function method for the knapsack problem and give the algorithm.

14. a) Give the summary of the simplex method.

(OR)

b) Prove that the stable marriage algorithm terminates after no more than n^2 iterations with a stable marriage output.

15. a) What is Class NP ? Discuss about any five problems for which no polynomial - time algorithm has been found.

(OR)

b) Elaborate on the nearest-neighbor algorithm and multifragment-heuristic algorithm for TSP problem.

PART – C **(1×15=15 Marks)**

16. a) Consider the problem of finding the smallest and largest elements in an array of n numbers.

i) Design a presorting-based algorithm for solving this problem and determine its efficiency class. **(7)**

ii) Compare the efficiency of the three algorithms :

(A) the brute-force algorithm. (B) this presorting-based algorithm, and (C) the divide-and conquer algorithm. (8)

(OR)

b) Apply Warshall's algorithm to find the transitive closure of the digraph defined by the following adjacency matrix

$$\begin{bmatrix} 0 & 1 & 0 & 0 \\ 0 & 0 & 1 & 0 \\ 0 & 0 & 0 & 1 \\ 0 & 0 & 0 & 0 \end{bmatrix}$$

i) Prove that the time efficiency of Warshall's algorithm is cubic. (7)

ii) Explain why the time efficiency of Warshall's algorithm is inferior to that of the traversal-based algorithm for sparse graphs represented by their adjacency lists. (8)

Reg. No. : | | | | | | | | | | | | |

Question Paper Code : 52863

B.E./B.Tech. DEGREE EXAMINATIONS, APRIL/MAY, 2019.

Third/Fourth Semester

Computer Science and Engineering

CS 6402 — DESIGN AND ANALYSIS OF ALGORITHMS

(Common to Information Technology)

(Regulation 2013)

Time : Three hours Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. Design an algorithm to compute the area and Circumference of a circle.
2. Define recurrence relation.
3. Give the general strategy of Divide and Conquer Method.
4. What is the closest - pair problem?
5. State the general principle of greedy algorithm
6. What do you mean by dynamic programming?
7. What do you mean by 'perfect matching' in bipartite graphs?
8. Define flow 'cut'.
9. Draw the decision tree for comparison of three values.
10. Depict the proof which says that a problem 'A' is no harder or no easier than problem 'B'.

PART B — (5 × 13 = 65 marks)

11. (a) Briefly explain the mathematical analysis of recursive and non-recursive algorithm.

Or

(b) Explain briefly Big oh Notation, Omega Notation and Theta Notations. Give examples.

12. (a) (i) Write the algorithm to perform Binary Search and compute run time complexity.

(ii) Compute the multiplication of given two matrices using Strassen's matrix multiplication method.

$$A = \begin{bmatrix} 1 & 0 & 2 & 1 \\ 4 & 1 & 1 & 0 \\ 0 & 1 & 3 & 0 \\ 5 & 0 & 2 & 1 \end{bmatrix} \quad B = \begin{bmatrix} 0 & 1 & 0 & 1 \\ 2 & 1 & 0 & 4 \\ 2 & 0 & 1 & 1 \\ 1 & 3 & 5 & 0 \end{bmatrix}.$$

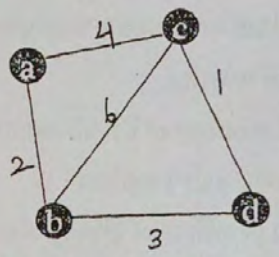
Or

(b) (i) Write down the algorithm to construct a convex hull based on divide and conquer strategy.

(ii) Find the optimal solution to the fractional knapsack problem with given data :

Item	Weight	Benefit
A	2	60
B	3	75
C	4	90

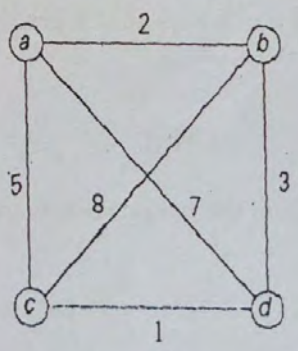
13. (a) Discuss about the algorithm and Pseudocode to find the Minimum Spanning Tree using Prim's Algorithm. Find the Minimum Spanning tree for the graph shown below :



And Discuss about the efficiency of the Algorithm.

Or

(b) Find all the Solution to the travelling salesman problem (cities and distances shown below) by exhaustive search. Give the optimal solution.



14. (a) (i) State and prove Max-Flow Min-Cut Theorem

(ii) Summarize the steps of the simplex method.

Or

(b) (i) Explain briefly about Stable marriage algorithm.

(ii) Determine the time-efficiency class of the stable marriage algorithm.

15. (a) (i) Suggest an approximation algorithm for traveling salesperson problem. Assume that the cost function satisfies the triangle inequality.

(ii) Explain how job assignment problem could be solved, given n tasks and n agents where each agent has a cost to complete each task, using Branch and Bound technique.

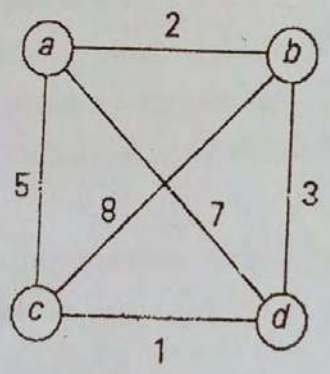
Or

(b) (i) The knight is placed on the first block of an empty board and, moving according to the rules of chess, must visit each square exactly once. Solve the above problem using backtracking procedure.

(ii) Implement an algorithm for Knapsack problem using NP-Hard approach.

PART C — (1 × 15 = 15 marks)

16. (a) Apply Branch and Bound algorithm to solve the Travelling Salesman Problem for (15)



Or

(b) Write an algorithm for quick sort and write its time complexity with example list are 5, 3, 1, 9, 8, 2, 4, 7. (15)

Reg. No. : | | | | | | | | | | | | |

Question Paper Code : 91393

B.E./B.Tech. DEGREE EXAMINATIONS, NOVEMBER/DECEMBER 2019
Third/Fifth/Eighth Semester
Computer Science and Engineering
CS 6302 – DATABASE MANAGEMENT SYSTEMS
(Common to Computer Science and Engineering/Mechanical and Automation Engineering/Mechatronics Engineering/Information Technology)
(Regulations – 2013)
(Also Common to PTCS 6302 – Database Management Systems for B.E. (Part-Time) – Second Semester – Computer Science and Engineering – Regulations 2014)

Time : Three Hours | Maximum : 100 Marks

Answer ALL questions

PART – A (10×2=20 Marks)

1. What are the major drawbacks of File Processing System ?
2. What is meant by weak entity set ? Explain with an example.
3. Write short note on Aggregate functions. Give examples.
4. Can a view be defined with other view ? Explain with an example.
5. Differentiate Loss less join decomposition and Lossy Join decomposition.
6. How do you estimate the cost of the Hash Join ? How is it different from Hybrid Hash Join ?
7. Give the different forms of query that are possible with Multimedia Database Systems.
8. Compare and Contrast Range Partitioning and Hash Partitioning.
9. Give examples of different query languages of Object Relational Databases.
10. Mention few applications of Data Mining.

PART – B (5×13=65 Marks)

11. a) Define Normalization. Explain the different levels of Normal forms for the relation given below.

Project_employee table (Proj.Num, Proj.Name, Empid, Empname, Designation, Hourly charges, total no. of hours worked, Total Charges).

(Note : Fill the table with appropriate Values)

(OR)

b) Explain in detail on the Codd's rule on relational database.

12. a) Consider the following relational schema

Emp (eid:integer, ename:string, salary:real)

Works (eid:integer, did:integer)

Dept (did:integer, dname:string,_managerid: integer, floornum: integer)

Write the following queries in QBE. Be sure to underline your variables to distinguish them from your constants.

1. Print the names of all employees who work on the 10th floor and gets less than Rs. 50,000 as their salary.
2. Print the names of all managers who manage three or more departments on the same floor.
3. Give every employee who works in the toy department a 10% raise.
4. Print all of the attributes for employees who work in some department that employee ABC also works in.
5. Print the name of each department that has a manager whose last name is PABC and who is neither the highest paid nor the lowest paid employee in the department.

(OR)

b) Prove the statement "When the column of a view is directly derived from a column of a base table, that column inherits any constraints that apply to the column of the base table" by using suitable example.

13. a) Elaborate on the following

i) Two phase locking protocol. (7)

ii) Graph based protocol. (6)

(OR)

b) Explain Concurrency Control and Deadlock in relation to databases with examples.

14. a) i) Elaborate on Web Databases. (9)

ii) Explain about the advantage of using RAID. (4)

(OR)

b) Explain how B and B+ tree are processed ? Give one example for each.

15. a) Discuss in detail on the recovery techniques that can be applied to the common types of database failure.

(OR)

b) i) Give a detailed note on the challenges involved in mining spatial data ? (7)

ii) Explain the concept of clustering in Data Mining. (6)

PART – C (1×15=15 Marks)

16. a) Elaborate on : (8)

i) Distributed databases. (7)

ii) Information Retrieval.

(OR)

b) i) Explain in detail about Database Security. (8)

ii) XML Databases. (7)

Reg. No. : | | | | | | | | | | | | |

Question Paper Code : 71674

B.E./B.Tech. DEGREE EXAMINATION, APRIL/MAY 2017.

Third/Fifth/Eighth Semester

Computer Science and Engineering

CS 6302 — DATABASE MANAGEMENT SYSTEMS

(Common to Mechanical and Automation Engineering, Mechatronics Engineering, Information Technology)

(Regulations 2013)

Time : Three hours | Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. What are the desirable properties of decomposition?

2. Distinguish between key and super key.

3. What is a query execution plan?

4. Which cost component are used most often as the basis for cost function?

5. What is serializable schedule?

6. What type of locking needed for insert and delete operations?

7. Define replication transparency.

8. State the function of data marts.

9. Define support and confidence.

10. Distinguish between threats and risks.

PART B — (5 × 13 = 65 marks)

11. (a) Discuss the correspondence between the ER model construct and the relational model constructs. Show how each ER model construct can be mapped to the relational model. Discuss the option for mapping EER model construct.

Or

(b) (i) Explain the overall architecture of the data base system in detail. (8)

(ii) List the operations of relational algebra and the purpose of each with example. (5)

12. (a) What is meant by semantic query optimization? How does it differ from other query optimization technique? Give example.

Or

(b) Justify the need of embedded SQL. Consider the relation student (Reg No, name, mark, and grade). Write embedded dynamic SQL Program in C language to retrieve all the students' records whose mark is more than 90. (2+11)

13. (a) Discuss the violations caused by each of the following: dirty read, non repeatable read and phantoms with suitable example.

Or

(b) Explain why timestamp-based concurrency control allows schedules that are not recoverable. Describe how it can be modified through buffering to disallow such schedules.

14. (a) (i) Compare and contrast the distributed databases and the centralized database systems. (8)

(ii) Describe the mobile database recovery schemes. (5)

Or

(b) Explain what a RAID system is. How does it improve performance and reliability. Discuss the level 3 and level 4 of RAID. (3 + 4 + 6)

15. (a) (i) What are the basic crawling operations. Explain the processing steps in crawling procedure with example. (8)

(ii) Explain the process of querying XML data with an example. (5)

Or

(b) Describe the various components of data warehouse and explain the different data models used to store data with example.

PART C — (1 × 15 = 15 marks)

16. (a) Consider the relation schema given in Figure 1. Design and draw an ER diagram that capture the information of this schema. (5)

Employee (empno, name, office, age)
Books (isbn, title, authors, publisher)
Loan (empno, isbn, date)

Figure 1.

Write the following queries in relational algebra and SQL.

(i) Find the names of employees who have borrowed a book published by McGraw-Hill. (5)

(ii) Find the names of employees who have borrowed all books published by McGraw-Hill. (5)

Or

(b) Trace the results of using the Apriori algorithm on the grocery store example with support threshold $s = 33.34\%$ and confidence threshold $c = 60\%$. Show the candidate and frequent itemsets for each database scan. Enumerate all the final frequent itemsets. Also indicate the association rules that are generated and highlight the strong ones, sort them by confidence.

Transaction ID	Items
T1	HotDogs, Buns, Ketchup
T2	HotDogs, Buns
T3	HotDogs, Coke, Chips
T4	Chips, Coke
T5	Chips, Ketchup
T6	HotDogs, Coke, Chips

Reg. No. : | | | | | | | | | | | | |

Question Paper Code : 40901

B.E./B.Tech. DEGREE EXAMINATION, APRIL/MAY 2018
Third/Fifth/Eighth Semester
Computer Science and Engineering
CS 6302 – DATABASE MANAGEMENT SYSTEMS
(Common to : Mechanical and Automation Engineering/Mechatronics Engineering/Information Technology)
(Regulations 2013)

Time : Three Hours

Maximum : 100 Marks

Answer ALL questions

PART – A

(10×2=20 Marks)

1. What is a weak entity ? Give example.
2. Define a foreign key. Give example.
3. What is data definition language ? Give example.
4. Outline the steps involved in query processing.
5. What is serializability ?
6. State the difference between a shared lock and an exclusive lock.
7. What is a hash function? Give example.
8. Define data mining.
9. What is a distributed database management system ?
10. State the difference between classification and clustering.

PART – B (5×13=65 Marks)

11. a) Explain the select, project, Cartesian product and join operations in relational algebra with an example. (13)

(OR)

b) What is database normalization ? Explain first normal form, second normal form and third normal form with an example. (13)

12. a) Explain the aggregate functions in SQL with an example. (13)

(OR)

b) What is query optimization ? Outline the steps in query optimization. (13)

13. a) i) During execution, a transaction passes through several states, until it finally commits or aborts. List all possible sequences of states through which a transaction may pass. Explain why each state transition may occur ? (6)

ii) Explain with an example the properties that must be satisfied by a transaction. (7)

(OR)

b) i) What is concurrency control ? Explain the two phase locking protocol with an example. (7)

ii) Explain conflict serializability and view serializability. (6)

14. a) What is hashing ? Explain static hashing and dynamic hashing with an example. (13)

(OR)

b) Outline the features of the following databases :

i) Parallel databases. (7)

ii) Multimedia databases. (6)

15. a) i) Present an overview of database security. (8)

ii) Explain with diagrammatic illustration the architecture of a distributed database management system. (5)

(OR)

b) Explain the necessary characteristics a system must satisfy to be considered as an object oriented database management system. (13)

PART – C (1×15=15 Marks)

16. a) Consider the following scenario :

A university registrar's office maintains data about the following entities : (a) courses, including number, title, credits, syllabus and prerequisites (b) course offerings, including course number, year, semester, section number, instructor, timings and classroom (c) students, including student-id, name, and program and (d) instructors, including identification number, name, department and title. Further, the enrollment of students in courses and grades awarded to students in each course they are enrolled for must be appropriately modeled.

i) Model an entity relationship diagram for the above scenario. (6)

ii) Map the entity relationship diagram you have modeled to relations. (9)

(OR)

b) Apply the Apriori algorithm for discovering frequent item sets to the following data set :

Trans ID	Items Purchased
101	Mulberry, Raspberry, Cherry
102	Mulberry, Papaya
103	Papaya, Mango
104	Mulberry, Raspberry, Cherry
105	Passion Fruit, Cherry
106	Passion Fruit
107	Passion Fruit, Papaya
108	Mulberry, Raspberry, Guava, Cherry
109	Guava, Mango
110	Mulberry, Raspberry

Use 0.3 for the minimum support value. (15)

Reg. No. : | | | | | | | | | | | | |

Question Paper Code : 52858

B.E./B.Tech. DEGREE EXAMINATIONS, APRIL/MAY 2019.

Third/Fifth/Eighth Semester

Computer Science and Engineering

CS 6302 — DATABASE MANAGEMENT SYSTEMS

(Common to Mechanical and Automation Engineering/Mechatronics Engineering/Information Technology)

(Regulation 2013)

(Also common to PTCS 6302 – Database Management Systems for B.E. (Part-Time) - Second Semester – Computer Science and Engineering – Regulation 2014)

Time : Three hours Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. What is a primary key? Give example.

2. Define denormalization.

3. What is data definition language?

4. Outline the use of commit and rollback.

5. Name the properties that must be satisfied by a transaction.

6. Outline the need for concurrency control.

7. State the difference between B tree and B^+ tree indexing.

8. Define a data mart.

9. What is cryptography?

10. What is persistence in object oriented databases?

PART B — (5 × 13 = 65 marks)

11. (a) Explain select, project, Cartesian product and equality join in relational algebra with an example. (13)

Or

(b) Consider a relation $R(A,B)$. R is in first normal form. Justify R is in second normal form, third normal form and BCNF. (13)

12. (a) Consider the following relations:

EMPLOYEE (ENO, NAME, DATE_BORN GENDER,
DATE_OF_JOINING, DESIGNATION, BASIC_PAY, DNO)

DEPARTMENT (DNO, DNAME)

The primary key is underlined. Write SQL queries to perform the following :

(i) Display the employee number, name, department number and department name of all employees. (3)

(ii) List the details of employees who earn less than the average basic pay of all employees. (4)

(iii) List the department number and number of employees in each department. (4)

(iv) List the details of employees who work for DNO = 'CSE'. (2)

Or

(b) Outline the steps in query processing with a diagram and an example. (13)

13. (a) (i) Explain time stamp based concurrency control algorithm with an example. (6)

(ii) What is dead lock? Explain the four conditions for dead lock with an example. (7)

Or

(b) Outline the various problems that occur due to concurrent transactions. Also, outline the two phase locking protocol used for concurrency control with an example.

14. (a) (i) Outline static hashing and dynamic hashing with an example. (8)

(ii) Distinguish between primary index and secondary index. Give example. (5)

Or

(b) Pretest as outline of the following

(i) Distributed database management systems. (4)

(ii) Spatial databases. (5)

(iii) Data warehousing. (4)

15. (a) (i) What is database access control? Compare the processes of discretionary and mandatory access control mechanisms. (8)

(ii) Outline the structure of an XML document with an example. (5)

Or

(b) What is an object oriented database management system? Outline the characteristics of an object oriented database management system. (13)

PART C — (1 × 15 = 15 marks)

16. (a) Consider the following case study describing the academic functioning of a college:

- A college has many departments.
- A department would have many students as well as employs many faculty members
- A student can register into various courses; similarly a course can be registered by many students
- A student lives in a single hostel but a hostel accommodates many students
- A department offers many courses but a particular course is offerred by a particular department
- A faculty teaches many courses. A course is taught by many faculties.

Model a E-R diagram for the above scenario. (15)

Or

(b) Outline the steps in the Apriori algorithm for mining association rules with an example. (15)

Reg. No. : | | | | | | | | | | | | |

Question Paper Code : 50385

B.E./B.Tech. DEGREE EXAMINATION, NOVEMBER/DECEMBER 2017

Third/Fourth Semester

Computer Science and Engineering

CS6304 – ANALOG AND DIGITAL COMMUNICATION

Common to : Biomedical Engineering/Information Technology

(Regulations 2013)

Time : Three Hours | Maximum : 100 Marks

Answer ALL questions

PART – A (10×2=20 Marks)

1. An amplifier operating over the frequency range of 455 to 460 KHz has a 200 kΩ input resistor. What is the RMS noise voltage at the input to this amplifier if the ambient temperature is 17°C ?
2. Find the modulating frequency and maximum deviation of the PM wave represented by $v(t) = 12 \sin (6 + 10^8 t + 5 \cos 1250t)$.
3. Draw the FSK signal for the binary message 1011001.
4. Define bandwidth efficiency.
5. List out the standards organization for data communication.
6. Define coding efficiency of a PCM system.
7. Calculate the entropy of four possible messages {Q1, Q2, Q3, Q4} which is transmitted with probabilities {1/8, 3/8, 3/8, 1/8}.
8. What is the principle advantage of sequential decoding of convolution code ?
9. Differentiate GSM over CDMA.
10. What is Bluetooth technology ? And mention its application.

PART – B (5×13=65 Marks)

11. a) i) Derive the expression for the instantaneous voltage of AM wave. (7)

ii) For an AM DSBFC transmitter with an unmodulated carrier power Pc = 100W that is modulated simultaneously by three modulating signals with coefficients of modulation m1 = 0.2, m2 = 0.4 and m3 = 0.5, determine :

1) Total coefficient of modulation
2) Upper and lower sideband power
3) Total transmitted power. (6)

(OR)

b) i) Draw the block diagram of Armstrong indirect FM transmitter and describe its operation. (9)

ii) Discuss the advantages and disadvantages of angle modulation. (4)

12. a) i) A BPSK modulator with a carrier frequency of 70 MHz and an input bit rate of 10 Mbps, determine the following :

1) maximum and minimum upper and lower side frequencies
2) minimum Nyquist bandwidth and
3) Baud rate. (6)

ii) With a block diagram explain the working of coherent binary FSK transmitter and receiver. (7)

(OR)

b) i) Determine the baud, minimum bandwidth and bandwidth efficiency for an 8-PSK system operating with an information bit rate of 24 kbps. (6)

ii) Draw the block diagram of 8-QAM transmitter and explain its working. (7)

13. a) i) Describe the following data communications codes : Baudot, ASCII and EBCDIC. (6)

ii) Explain the generation of PCM signal with a block diagram. (7)

(OR)

b) i) Explain the working of a two station data communication circuit with a block diagram. (7)

ii) Describe the generation and demodulation of PPM signal with necessary waveforms. (6)

4. a) Five source messages are probable to appear as m1 = 0.4, m2 = 0.15, m3 = 0.15, m4 = 0.15, and m5 = 0.15. Determine the coding efficiency for
   1) Shannon-Fano coding
   2) Huffman coding (13)

(OR)

b) i) Derive the expression for mutual information and channel capacity. (7)

ii) What are the types of error control coding ? Describe the working of viterbi decoding algorithm. (6)

5. a) i) Briefly describe the advanced mobile telephone system. (6)

ii) Discuss in detail about the architecture of GSM with necessary diagram. (7)

(OR)

b) i) Describe the concept of frequency reuse, channel assignment and hand-off in a cellular system. (7)

ii) Briefly discuss about the different multiple access schemes. (6)

PART – C (1×15=15 Marks)

6. a) i) The first stage of a two-stage amplifier has a voltage gain of 10, a 600Ω input resistor, a 1600Ω equivalent noise resistance and a 27kΩ output resistor. For the second stage, these values are 25,81kΩ, 10kΩ and 1MΩ respectively. Calculate the equivalent input noise resistance of this two stage amplifier. (5)

ii) Write short notes on :
   1) Data communications hardware
   2) Serial and parallel interface. (10)

(OR)

b) i) Draw the block diagram of CDMA encoder and decoder and briefly explain its working. (8)

ii) Briefly discuss the generation of convolution code with an example. (7)

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Question Paper Code : 20361

B.E./B.Tech. DEGREE EXAMINATION, NOVEMBER/DECEMBER 2018.

Third/Fourth Semester

Computer Science and Engineering

CS 6304 — ANALOG AND DIGITAL COMMUNICATION

(Common to Biomedical Engineering, Information Technology)

(Regulations 2013)

Time : Three hours Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. Differentiate between Amplitude and Frequency Modulation.
2. Define Modulation Index.
3. State the significance of constellation diagram?
4. What is bandwidth efficiency?
5. Mention the advantages of digital transmission.
6. What is the principle of pulse modulation?
7. State Shannon's fundamental theorem of information theory.
8. Define Hamming distance (HD).
9. List the features of Hand off Technique.
10. What is the advantage of cell splitting concept?

PART B — (5 × 13 = 65 marks)

11. (a) Explain the operation of Super heterodyne receiver.

Or

(b) Explain the principle of AM modulation with mathematical analysis. Draw the AM wave and explain its power distribution.

12. (a) Draw the block diagram of QPSK modulator, demodulator and explain the principle of operation.

Or

(b) Describe the basic principle of Quadrature amplitude modulation. Compare shift keying Techniques with QAM.

13. (a) Explain Pulse Code Modulation System with the help of block diagram.

Or

(b) (i) Draw the block diagram of Data Communication system and explain. (8)

(ii) What is the need for error detection and correction Techniques? (5)

14. (a) Consider a (5, 1) linear block code defined by the generator matrix $G = [1\,1\,1\,1\,1]$

(i) Find the parity check matrix H of the code in systematic form. (2)

(ii) Find the encoding table for the linear block code. (2)

(iii) What is the minimum distance *dmin* of the code. How many errors can the code detect. How many errors can the code correct. (2)

(iv) Find the decoding table for the linear block code (consider single bit errors only). (4)

(v) Suppose $c = [1\,1\,1\,1\,1]$ is sent and $r = [0\,1\,1\,1\,1]$ is received. Show how the code can correct this error. (3)

Or

(b) What is source coding? Explain the steps involved in Shannon Fano coding with suitable example.

15. (a) Draw and explain the architecture of GSM.

Or

(b) Explain in detail the principle and operation of a CDMA system.

PART C — (1 × 15 = 15 marks)

16. (a) (i) What are the Types and benefits of shift keying Techniques? (5)

(ii) Explain the process of Locating Co-channel Cells in a Cellular Network. (10)

Or

(b) (i) Compare the bit error rate performance for PSK, DPSK and FSK. (5)

(ii) With the help of an example, explain Viterbi Convolutional Decoding Algorithm. (10)

Reg. No. : | | | | | | | | | | | | |

Question Paper Code : 91395

B.E./B.Tech. DEGREE EXAMINATIONS, NOVEMBER/DECEMBER 2019

Third/Fourth Semester

Computer Science and Engineering

CS 6304 – ANALOG AND DIGITAL COMMUNICATION

(Common to B.E. Biomedical Engineering/Information Technology)

(Regulations 2013)

Time : Three Hours | Maximum : 100 Marks

Answer ALL questions

PART – A (10×2=20 Marks)

1. Name the three types of internal noise.
2. The total power of fully modulated AM transmitter is 1KW. Calculate the power transmitted, if it is transmitted as SSB.
3. Define Minimum Shift Keying.
4. Compare BPSK over QPSK.
5. List out the standard organization of data communication.
6. Define pulse time modulation.
7. A discrete data source produces messages from a set $\{x_1, x_2, x_3, x_4\}$ where the probabilities associated with the messages are $p_1=1/4$, $p_2 = 1/8$, $p_3 = 1/8$ and $p_4 = 1/2$. Find the entropy of this source.
8. Write down the properties of cyclic codes.
9. Differentiate GSM over CDMA.
10. What is Advanced Mobile Phone System ?

PART – B (5×13=65 Marks)

11. a) One input to a conventional AM modulator is a 500 kHz carrier with an amplitude of $20V_p$. The second input is a 10 kHz modulating signal that is sufficient amplitude to cause a change in the output wave of $\pm 7.5V_p$. Determine:

1) Upper and lower side frequencies.
2) Modulation coefficient and percent modulation.
3) Peak amplitude of the modulated carrier and the upper and lower side frequency voltages.
4) Maximum and minimum amplitudes of the envelope.
5) Expression for the modulated wave. (13)

(OR)

b) i) Explain the generation of SSB-SC signal using phase shift method with necessary diagram. (7)

ii) Describe the relationship between instantaneous carrier frequency and modulating signal for FM. (6)

12. a) Draw the block diagram of BPSK transmitter and receiver and explain its working in detail. (13)

(OR)

b) i) Define QAM and explain the generation of 16-QAM with necessary block diagram. (7)

ii) For an 8-PSK system, operating with an information bit rate of 24kbps, determine (6)

1) Baud
2) Minimum bandwidth
3) Bandwidth efficiency.

13. a) i) Define error detection and briefly explain the four different approaches in redundancy checking. (7)

ii) Draw the simplified block diagram of a two station data communication circuit and also describe its working in detail. (6)

(OR)

b) i) Draw the block diagram of simplex PCM transmission system and explain its working in detail. (7)

ii) Compare different pulse communication system namely PAM, PTM and PCM. (6)

14. a) i) State and prove the Shannon source coding theorem. (6)

ii) Consider the following eight messages with their given probabilities. With binary code, the average message length is 3 bits. Find the average message length when Huffman coding is employed to code the messages.

$p(m_1) = 0.14$, $p(m_2) = 0.22$, $p(m_3) = 0.26$, $p(m_4) = 0.12$, $p(m_5) = 0.08$, $p(m_6) = 0.05$, $p(m_7) = 0.03$, $p(m_8) = 0.10$. (7)

(OR)

b) The parity check matrix of a particular (7,4) linear block code is given by, (13)

(13)

$$[H] = \begin{bmatrix} 1 & 1 & 1 & 0 & 1 & 0 & 0 \\ 1 & 1 & 0 & 1 & 0 & 1 & 0 \\ 1 & 0 & 1 & 1 & 0 & 0 & 1 \end{bmatrix}$$

(7) Find :

(6) 1) Find the generator matrix (G).

2) List all the code vectors.

(13) 3) What is the minimum distance between the code vectors ?

4) How many errors can be detected ? How many can be corrected ?

15. a) i) Explain the working of Global system for mobile communication with necessary diagram in detail. (7)

(7)

(6) ii) Briefly discuss the frequency reuse and handoff in cellular mobile communication. (6)

(OR)

b) Elaborate the working of uplink, transponder and downlink models of a satellite system. (13)

(7)

(6)

PART – C (1×15=15 Marks)

16. a) i) Explain the following data communication codes with example.

(7) 1) Baudot code (3)

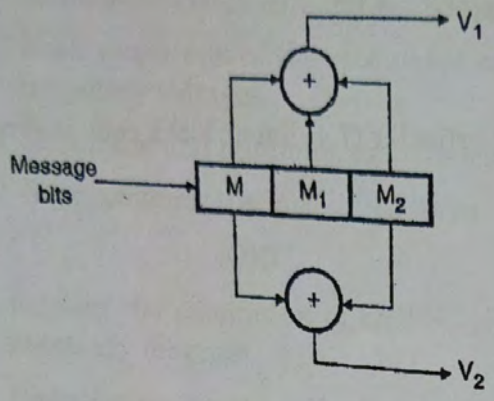
2) ASCII code (3)

(6) 3) EBCDIC code (3)

ii) Briefly discuss the serial and parallel data transmission with necessary diagram. (6)

(OR)

b) For the given coder shown below, obtain the convolutional code for the bit sequence 1 1 0 1 1 0 1 1 and decode it by constructing the corresponding code tree. (15)



Reg. No. : | | | | | | | | | | | | |

Question Paper Code : 40903

B.E./B.Tech. DEGREE EXAMINATION, APRIL/MAY 2018
Third/Fourth Semester
Computer Science and Engineering
CS6304 – ANALOG AND DIGITAL COMMUNICATION
(Common to Biomedical Engineering/Information Technology)
(Regulations 2013)

Time : Three Hours | Maximum : 100 Marks

Answer ALL questions

PART – A **(10×2=20 Marks)**

1. Give the classification of noise.
2. A carrier of 10 MHz frequency and peak value of 10 V is amplitude modulated by a 5 KHz sinewave of 6 V amplitude. Find the modulation index.
3. For 16 PSK and a transmission system with a 10 KHz bandwidth, find the maximum bit rate.
4. What is QAM ?
5. Find the number of Hamming bits required for a 12 bit data string to form an error control code.
6. State two functions of UART.
7. Find the entropy of the source $X = \{x_1, x_2\}$ with the message probabilities $\left\{\frac{1}{2}, \frac{1}{2}\right\}$.
8. Define channel capacity.
9. Find the number of cells in a cluster and locate the first-tier-co-channel cells for the following values : $j = 2$ and $i = 3$.
10. What is FDMA ?

PART – B (5×13=65 Marks)

11. a) i) The available output noise power from an amplifier is 80 nW, the available power gain of the amplifier being 40 dB and the equivalent noise bandwidth being 25 MHz. Find the noise figure, assuming room temperature to be 27°C. (4)

ii) Explain the phasing method of generation of SSB-Sc signal. (9)

(OR)

b) i) A FM radio link has a frequency deviation of 30 KHz. The modulating frequency is 3 KHz. Find the bandwidth needed for the link. (3)

ii) An angle-modulated signal has the form $v(t) = 100 \cos [2\pi f_c t + 4 \sin 2000\pi t]$ where fc = 10 MHz.

Find :

a) The average transmitted power (1)

b) Peak phase deviation (3)

c) Peak frequency deviation (3)

d) Is this FM or a PM signal ? Explain. (3)

12. a) i) Find :

a) The peak frequency deviation

b) Minimum bandwidth

c) Band for a binary FSK signal with a mark frequency of 49 KHz, a space frequency of 51 KHz and an input bit rate of 2 kbps. (3)

ii) Draw the ASK, FSK, BPSK and QPSK waveforms for the bit stream 10110001. (8)

iii) What is MSK ? (2)

(OR)

b) Compare the various digital modulation techniques. (13)

13. a) i) Explain the working of a simplified two-station data communication circuit. Explain the various data transmission modes. (8)

ii) Briefly write on standard organisations for data communications. (5)

(OR)

b) i) Explain the working of PCM transmitter. (10)

ii) Define PAM and PTM. (3)

14. a) i) Encode the following source using Shannon-Fano technique. Find the coding efficiency P[X] = [0.48 0.15 0.10 0.10 0.07 0.05 0.03 0.02] (11)

ii) State channel coding theorem. (2)

(OR)

b) Explain viterbi decoding algorithm. Make suitable assumptions. (13)

15. a) Explain the following :

i) Frequency reuse (5)

ii) Channel assignment and Hand off strategies. (8)

(OR)

b) i) Write notes on Bluetooth. (4)

ii) Explain various multiple access schemes. (9)

PART – C (1×15=15 Marks)

16. a) i) Consider a discrete memoryless source with five different symbols with their respective probabilities as 0.1, 0.2, 0.4, 0.1 and 0.2. Encode the source using Huffman coding and find the coding efficiency. (12)

ii) What is the need for modulation. (3)

(OR)

b) i) Explain, satellite communication system using a block diagram. (12)

ii) Draw the signal constellation diagrams of 16 QAM and 16 PSK. (3)

Reg. No. : | | | | | | | | | | | | |

Question Paper Code : 52860

B.E./B.Tech. DEGREE EXAMINATIONS, APRIL/MAY 2019.

Third/Fourth Semester

Computer Science and Engineering

CS 6304 — ANALOG AND DIGITAL COMMUNICATION

(Common to Biomedical Engineering/Information Technology)

(Regulation 2013)

Time : Three hours Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. Identify external and internal noise in communications.
2. State the advantages of FM modulation.
3. Draw the FSK signal for the bit stream 0101010.
4. Define Bandwidth efficiency.
5. List out the different types of data communication codes.
6. Recall types of pulse analog modulation.
7. A source of four messages with probabilities { 1/8, 3/8, 3/8, 1/8 }. Find the entropy of the source.
8. Differentiate block code over convolution code.
9. Define the advanced mobile phone system.
10. Define Bluetooth technology.

PART B — (5 × 13 = 65 marks)

11. (a) (i) A receiver connected to an antenna whose resistance is 50 Ω has an equivalent noise resistance of 30 Ω. Calculate the receiver's noise figure. (5)

(ii) Enumerate the theory of amplitude modulation with necessary waveforms. (8)

Or

(b) (i) Describe the advantages and disadvantages of SSB techniques. (6)

(ii) Explain the theory behind the frequency and phase modulation with necessary equations. (7)

12. (a) Explain the generation and reception of binary phase shift keying signal with necessary block diagram. (13)

Or

(b) (i) Define QAM and explain the generation of 8-QAM signal with necessary block diagram. (8)

(ii) Compare the different digital modulation systems in terms of bandwidth, noise immunity, bit rate and error probability. (5)

13. (a) (i) Consider a PAM transmission of a voice signal with maximum frequency 3 KHz. Calculate the transmission bandwidth B_T if the width of each pulse, $\tau = 0.1\ T_s$ where T_s is the sampling period and the sampling frequency $f_s = 8$ kHz. (5)

(ii) Explain the principle of generation and demodulation of PPM with block diagram. (8)

Or

(b) (i) Briefly discuss the following data communication codes : (6)

(1) Baudot code

(2) ASCII code

(3) EBCDIC code

(ii) Outline the various error detection techniques. (7)

14. (a) An error control code has the following parity check matrix. (13)

$H = \begin{bmatrix} 1 & 0 & 1 & 1 & 0 & 0 \\ 1 & 1 & 0 & 0 & 1 & 0 \\ 0 & 1 & 1 & 0 & 0 & 1 \end{bmatrix}$. Determine the generator matrix G and find the code word that begin with message sequence 101..

Or

(b) Explain the concept of channel capacity and channel coding theorem. (13)

15. (a) (i) Explain the working of satellite transponder with necessary block diagram. (7)

(ii) Briefly discuss the importance of frequency reuse and hand off in cellular system. (6)

Or

(b) Explain the working principle of the following systems.

(i) Code division multiple access techniques. (6)

(ii) Global system for mobile communications. (7)

PART C — (1 × 15 = 15 marks)

16. (a) (i) Outline the basic principle of Huffman code (5)

(ii) Perform a case study on Huffman codes for the given message symbols {a1, a2, a3, a4, a5} with probabilities {0.2, 0.1, 0.05, 0.6, 0.05} respectively. (10)

Or

(b) In a digital communication system, the bit rate of NRZ data stream is 1 Mbps and carrier frequency of transmission is 100 MHz. Determine the symbol rate of transmission and bandwidth requirement of the channel in the following cases of different techniques used. (15)

(i) BPSK system

(ii) QPSK system

(iii) 16-ary PSK system.

Reg. No. : | | | | | | | | | | | | |

Question Paper Code : 20360

B.E./B.Tech. DEGREE EXAMINATION, NOVEMBER/DECEMBER 2018.

Third/Fifth Semester

Computer Science and Engineering

CS 6303 — COMPUTER ARCHITECTURE

(Common to Electronics and Communication Engineering, Electronics and Instrumentation Engineering, Instrumentation and Control Engineering, Robotics and Automation Engineering, Information Technology).

(Regulations 2013)

(Also common to PTCS 6303 Computer Architecture B.E. (Part-Time) Third Semester – Computer Science and Engineering, Electronics and Communication Engineering — Regulations 2014)

Time : Three hours Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. Consider three processors P1, P2, and P3 executing the same instruction set. They have clock rates of 3 GHz, 2.5 GHz and 4.0 GHz respectively and CPI of 1.5, 1.0 and 2.2 respectively. Which processor has the highest performance expressed in instructions per second?

2. Classify the instructions based on the operations they perform and give one example to each category.

3. Perform X-Y using 2's complement arithmetic for the given two 16-bit binary numbers X = 0000 1011 1110 1111 and Y = 1111 0010 1001 1101.

4. Define sub-word parallelism.

5. Write the two steps that are common to implement any type of instruction.

6. What is an exception? Give one example for MIPS exception.

7. Web server is to be enhanced with a new CPU which is 10 times faster on computation than old CPU. The original CPU spent 40% of its time processing and 60% of its time waiting for I/O. What will be the overall speedup?

8. Classify shared memory multiprocessor based on the memory access latency.

9. Draw the memory hierarchy in a typical computer system.

10. What is meant by memory–mapped I/O?

PART B — ($5 \times 13 = 65$ marks)

11. (a) (i) Consider two different implementations of the same instruction set architecture. The instructions can be divided into four classes according to their CPI (class A, B, C, and D). P1 with a clock rate of 2.5 GHz and CPIs of 1, 2, 3, and 3 respectively, and P2 with a clock rate of 3 GHz and CPIs of 2, 2, 2, and 2 respectively. Given a program with a dynamic instruction count of 1.0×10^6 instructions divided into classes as follows: 10% class A, 20% class B, 50% class C, and 20% class D, which implementation is faster? What is the global CPI for each implementation? Find the clock cycles required in both cases. (7)

(ii) Explain the three broad classes of applications of computers. (6)

Or

(b) (i) Assume that the variables f and g are assigned to registers \$s0 and \$s1 respectively. Assume that the base address of the array A is in register \$s2. Assume f is zero initially.

$f = -g - A[4]$

$A[5] = f + 100$;

Translate the above C statements into MIPS code. How many MIPS assembly instructions are needed to perform the C statements and how many different registers are needed to carry out the C statements? (5)

(ii) Define addressing mode in a computer. What are the different MIPS addressing modes? Give one example instruction to each category. (8)

12. (a) (i) Multiply the following signed numbers using Booth algorithm. $A = (-34)_{10} = (1011110)_2$ and $B = (22)_{10} = (0010110)_2$ where B is multiplicand and A is multiplier. (6)

(ii) Draw the block diagram of integer divider and explain the division algorithm. (7)

Or

(b) (i) How IEEE 752 32-bit single precision floating print numbers represented? Example. How are print numbers represented? (3)

(ii) Explain floating point addition algorithm with a neat block diagram? (10)

13. (a) Draw a simple MIPS datapath with the control unit and explain the execution of ALU instructions. (13)

Or

(b) (i) A processor has five individual stages, namely, IF, ID, EX, MEM, and WB and their latencies are 250ps, 350ps, 150ps, 300ps, and 200ps respectively. The frequency of the instructions executed by the processor are as follows ; ALU : 40%, Branch : 25%, load : 20% and store:15% What is the clock cycle time in a pipelined and non-pipelined processor? If you can split one stage of the pipelined datapath into two new stages, each with half the latency of the original stage, which stage would you split and what is the new clock cycle time of the processor? Assuming there are no stalls or hazards, what is the utilization of the data memory? Assuming there are no stalls or hazards, what is the utilization of the write-register port of the "Registers" unit? (6)

(ii) List the hazards in pipelining a processor and give one example for each. (7)

14. (a) (i) List the software and hardware techniques to achieve Instruction Level Parallelism (ILP). (4)

(ii) Discuss the challenges in parallel processing in enhancing computer architecture. (9)

Or

(b) (i) Explain any three types of hardware multithreading. (9)

(ii) Define the classes in Flynn's Taxonomy of computer architectures. Give one example for each class. (4)

15. (a) (i) Discuss the three mapping techniques in memory hierarchy. Explain with examples. (10)

(ii) Define Translation Lookaside Buffer (TLB). What is its use? (3)

Or

(b) Explain mechanisms Direct Memory Access and Interrupt handling. (6 + 7)

PART C — (1 × 15 = 15 marks)

16. (a) (i) Consider web browsing application. Assuming both client and server are involved in the process of web browsing application, where can caches be placed to speed up the process? Design a memory hierarchy for the system. Show the typical size and latency at various levels of the hierarchy. What is the relationship between cache size and its access latency? What are the units of data transfers between hierarchies? What is the relationship between the data location, data size, and transfer latency?

(ii) The following sequence of instructions are executed in the basic 5-stage pipelined processor:

lw \$1, 40(\$6)

add \$6, \$2, \$2

sw \$6, 50(\$1)

Indicate dependences and their type. Assuming there is no forwarding in this pipelined processor, indicate hazards and add NOP instructions to eliminate them.

Or

(b) Compare hardwired and microprogrammed control unit designs in terms of their mechanism of generating control signals with diagram. (15)

Reg. No. : | | | | | | | | | | | | |

Question Paper Code : 91394

B.E./B.Tech. DEGREE EXAMINATIONS, NOVEMBER/DECEMBER 2019

Third/Fifth/Sixth Semester

Computer Science and Engineering

CS 6303 – COMPUTER ARCHITECTURE

(Common to Electronics and Communication Engineering/Electronics and Instrumentation Engineering/Instrumentation and Control Engineering/Robotics and Automation Engineering/Information Technology)

(Regulations 2013)

(Also Common to PTCS 6303 – Computer Architecture for B.E. Part-Time – Computer Science and Engineering – Second Semester, Fifth Semester – Electronics and Communication Engineering – Regulations 2014)

Time : Three Hours | Maximum : 100 Marks

Answer ALL questions

PART – A (10×2=20 Marks)

1. List the operating systems functions.
2. Define performance.
3. Tell the principle of alignment restriction.
4. Identify the MIPS fields.
5. List the MIPS addressing modes.
6. Define Data Hazards.
7. Identify the MIPS instruction classification.
8. Draw the Program Execution Order.
9. Define Miss Penalty.
10. Tell about the EPC and Cause Register.

PART – B (5×13=65 Marks)

11. a) Describe the components of the computer with diagram.

(OR)

b) Explain the various types of addressing modes with example.

12. a) Illustrate about the Signed and Unsigned Numbers.

(OR)

b) Convert Binary to Hexadecimal and back analyze the design principles.

13. a) Analyze the working principles of multiplication operations.

(OR)

b) What are the various types of data hazards ? Explain with example.

14. a) Illustrate about the four states of the simple controller.

(OR)

b) Describe about the instruction level parallelism.

15. a) Explain about DMA and Interrupt with necessary diagram.

(OR)

b) Explain how Cache performance can be measured and improved.

PART – C (1×15=15 Marks)

16. a) Analyze the process of reordering the code to avoid pipeline stalls.

(OR)

b) Analyze the compilation of floating-point C procedure with the example of Two-Dimensional Matrices.

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Reg. No. : | | | | | | | | | | | | |

Question Paper Code : 71675

B.E./B.Tech. DEGREE EXAMINATION, APRIL/MAY 2017

Third/Fifth/Sixth Semester

Computer Science and Engineering

CS 6303 — COMPUTER ARCHITECTURE

(Common to Electronics and Communication Engineering , Electronics and Instrumentation Engineering, Instrumentation and Control Engineering, Robotics and Automation Engineering, Information Technology)

(Regulations 2013)

Time : Three hours Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. List the major components of a computer system.

2. State the need for indirect addressing mode. Give an example.

3. Subtract $(11010)_2 - (10000)_2$ using 1's complement and 2's complement method.

4. Write the rules to perform addition on floating point numbers.

5. Name the control signals required to perform arithmetic operations.

6. Define hazard. Give an example for data hazard.

7. What is instruction level parallelism?

8. Distinguish implicit multithreading and explicit multithreading.

9. Define memory interleaving.

10. Summarize the sequence of events involved in handling an interrupt request from a single device.

PART B — (5 × 13 = 65 marks)

11. (a) Explain the important measures of the performance of a computer and derive the basic performance equation. (13)

Or

(b) Explain direct, immediate, relative and indexed addressing modes with examples. (13)

12. (a) (i) Demonstrate multiplication of two binary numbers with an example. Design an arithmetic element to perform this multiplication. (7)

(ii) Describe non restoring division with an example. (6)

Or

(b) (i) Design an arithmetic element to perform the basic floating point operations. (7)

(ii) What is meant by sub word parallelism? Explain. (6)

13. (a) Discuss the modified data path to accommodate pipelined executions with a diagram. (13)

Or

(b) (i) Explain the hazards caused by unconditional branching statements. (7)

(ii) Describe operand forwarding in a pipeline processor with a diagram. (6)

14. (a) (i) Discuss the challenges in parallel processing with necessary examples. (6)

(ii) Explain Flynn's classification of parallel processing with necessary diagrams. (7)

Or

(b) Explain the four principal approaches to multithreading with necessary diagrams. (13)

15. (a) Explain the different mapping functions that can be applied on cache memories in detail. (13)

Or

(b) (i) Explain virtual memory address translation in detail with necessary diagrams. (7)

(ii) What is meant by Direct Memory Access? Explain the use of DMA controllers in a computer system. (6)

PART C — (1 × 15 = 15 marks)

16. (a) (i) Explain mapping functions in cache memory to determine how memory blocks are placed in cache. (8)

(ii) Explain in detail about the Bus Arbitration techniques in DMA. (7)

Or

(b) A pipelined processor uses delayed branch technique. Recommend any one of the following possibility for the design of the processor. In the first possibility, the processor has a 4-stage pipeline and one delay slot. In the second possibility, it has a 6-stage pipeline and two delay slots. Compare the performance of these two alternatives, taking only the branch penalty into account. Assume that 20% of the instructions are branch instructions and that an optimizing compiler has an 80% success rate in filling in the single delay slot. For the second alternative, the compiler is able to fill the second slot 25% of the time.

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Reg. No. : | | | | | | | | | | | | |

Question Paper Code : 40902

B.E./B.Tech. DEGREE EXAMINATION, APRIL/MAY 2018

Third/Fifth/Sixth Semester

Computer Science and Engineering

CS 6303 – COMPUTER ARCHITECTURE

(Common to : Electronics and Communication Engineering/Electronics and Instrumentation Engineering/Instrumentation and Control Engineering/Robotics and Automation Engineering/Information Technology)

(Regulations 2013)

Time : Three Hours | Maximum : 100 Marks

Answer ALL questions

PART – A **(10×2=20 Marks)**

1. Write the equation for the dynamic power required per transistor.
2. Classify the instructions based on the operations they perform and give one example to each category.
3. Show the IEEE 754 binary representation of the number $(-0.75)_{10}$ in single precision.
4. Define a datapath in a CPU.
5. What is the ideal CPI of a pipelined processor ?
6. What is meant by exception ? Give one example of MIPS exception.
7. Protein String Matching Code has 4 days execution time on current machine doing integer instructions in 20% of time, doing I/O in 35% of time and other operations in the remaining time. Which is the better tradeoff among the following two proposals ? First : Compiler optimization that reduces number of integer instructions by 25% (assume each integer instruction takes the same amount of time); Second : Hardware optimization that reduces the latency of each IO operations from 6μs to 5μs.
8. Give example for each class in Flynn's classification.
9. Distinguish SRAM and DRAM.
10. What is the use of DMA Controller ?

PART – B (5×13=65 Marks)

11. a) i) Consider three different processors P1, P2 and P3 executing the same instruction set. P1 has a 3 GHz clock rate and a CPI of 1.5. P2 has a 2.5 GHz clock rate and a CPI of 1.0. P3 has a 4.0 GHz clock rate and has a CPI of 2.2.

a) Which processor has the highest performance expressed in instructions per second ?

b) If the processors each execute a program in 10 seconds, find the number of cycles and the number of instructions in each processor. (5)

ii) Explain in detail the components of a computer system. (8)

(OR)

b) i) Translate the following C code to MIPS assembly code. Use a minimum number of instructions. Assume that i and k correspond to registers $s3 and $s5 and the base of the array save is in $s6. What is the MIPS assembly code corresponding to this C segment ?

```
while (save[i] = = k)
i + = 1;
```

(5)

ii) What is an addressing mode in a computer ? Classify MIPS addressing modes and give one example instruction to each category. (8)

12. a) i) Perform X + Y and Y – X using 2's complements for given the two binary numbers X = 0000 1011 1110 1111 and Y = 1111 0010 1001 1101. (5)

ii) Multiply the following signed 2's compliment numbers using the Booth algorithm. A = 001110 and B = 111001 where A is multiplicand and B is multiplier. (8)

(OR)

b) i) Draw the block diagram of integer divider and explain the division algorithm. (5)

ii) Add the numbers $(0.75)_{10}$ and $(-0.275)_{10}$ in binary using the Floating point addition algorithm. (8)

13. a) Design a simple datapath with the control unit and explain in detail. (13)

(OR)

b) Discuss the limitations of pipelining a processor's datapath. Suggest the methods to overcome them. (13)

14. a) i) List the limitations of instruction level parallelism. (5)
ii) What are the challenges in parallel processing ? (8)

(OR)

b) i) Compare and contrast fine-grained multi-threading, coarse-grained multi-threading and simultaneous multi-threading. (9)
ii) Classify shared memory multiprocessor based on the memory access latency. (4)

15. a) i) What is the need for Cache memory ? List the three mapping methods of Cache memory and explain any two. (10)
ii) Define virtual memory. What is the advantage of using virtual memory ? (3)

(OR)

b) i) Discuss about Programmed I/Os associated with computers. (6)
ii) Write the sequence of operations carried out by a processor when interrupted by a peripheral device connected to it. (7)

PART – C (1×15=15 Marks)

16. a) The following sequence of instructions are executed in the basic 5-stage pipelined processor :

or r1, r2, r3
or r2, r1, r4
or r1, r1, r2

a) Indicate dependences and their type.
b) Assume there is no forwarding in this pipelined processor. Indicate hazards and add NOP instructions to eliminate them.
c) Assume there is full forwarding. Indicate hazards and add NOP instructions to eliminate them. (15)

(OR)

b) Explain the detail of DMA control with suitable diagrams. Discuss how it improve the overall performance of the system. (15)

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Reg. No. : | | | | | | | | | | | | |

Question Paper Code : 52859

B.E./B.Tech. DEGREE EXAMINATIONS, APRIL/MAY 2019.

Third/Fifth/Sixth Semester

Computer Science and Engineering

CS 6303 – COMPUTER ARCHITECTURE

(Common to: Electronics and Communication Engineering/Electronics and Communication Engineering/Electronics and Instrumentation Engineering/Instrumentation and Control Engineering/Robotics and Automation Engineering /Information Technology)

(Regulation 2013)

Also common to PTCS 6303 – Computer Architecture for Computer Science and Engineering (Fifth Semester – Regulation 2014)

Time : Three hours Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. Write the components of a computer system and list their functions.
2. Give the MIPS code for the statement f = (g + h) - (i + j).
3. State the rules to add two integers.
4. Define scientific notation and normalized notation.
5. Define edge triggered clocking.
6. Identify the hazards with respect to a processor function.
7. Neatly sketch the three primary units of dynamically scheduled pipeline.
8. Define speculation with example.
9. What is miss penalty?
10. How many total bits are required for a direct-mapped cache with 16 KB of data and 4-word blocks, assuming a 32-bit address?

PART B — (5 × 13 = 65 marks)

11. (a) Explain how performance is calculated in a computer system and derive the necessary performance equations.

Or

(b) Explain how instructions that involve decision making are executed with an example.

12. (a) Discuss how ALU performs division with the flow chart and the block diagram.

Or

(b) Explain floating point addition with a neat block diagram of ALU unit.

13. (a) Explain the process of building a single data–path with a neat diagram.

Or

(b) Explain data hazards and stalls with neat diagrams and suitable examples.

14. (a) Explain Flynn's classification with neat diagrams.

Or

(b) Explain hardware multithreading with neat diagrams.

15. (a) Explain the process of measuring the performance of cache memory with required metrics?

Or

(b) Explain the virtual memory organization followed in digital computers.

PART C — (1 × 15 = 15 marks)

16. (a) (i) Assume a two address format specified as source, destination. Examine the following sequence of instructions and explain the addressing modes used and the operation done in every instruction.

(1) Move (R5)+,R0

(2) ADD (R5)+,R0

(3) MOVE RO, (R5)

(4) Move 16(R5), R3

(5) Add #40, R5 (5)

(ii) Consider the following code segment in C:

a = b + e;

c = b + f;

Here is the generated MIPS code for this segment, assuming all variables are in memory and are addressable as off sets from $t0:

```
lw   $t1,  0($t0)
lw   $t2,  4($t0)
add  $t3,  $t1,$t2
sw   $t3,  12($t0)
lw   $t4,  8($t0)
add  $t5,  $t1,$t4
sw   $t5,  16($t0)
```

Find the hazards in the preceding code segment and reorder the instructions to avoid any pipeline stalls? (10)

Or

(b) (i) Analyze the merits and demerits of microprogrammed control over hardwired control. (7)

(ii) Analyze and tabulate the major features of programmed I/O, DMA and interrupts. (8)

Reg. No. :

Question Paper Code : 50657

B.E./B.Tech. DEGREE EXAMINATION, NOVEMBER/DECEMBER 2017
Third/Fourth/Fifth/Sixth/Seventh/Eighth Semester
Mechanical Engineering
GE 6351 – ENVIRONMENTAL SCIENCE AND ENGINEERING
(Common to : Aeronautical Engineering/Agriculture Engineering/Automobile Engineering/Biomedical Engineering/Civil Engineering/Computer Science and Engineering/Electrical and Electronics Engineering/Electronics and Communication Engineering/Electronics and Instrumentation Engineering/ Environmental Engineering/Geoinformatics Engineering/Industrial Engineering/ Industrial Engineering and Management/Instrumentation and Control Engineering/Manufacturing Engineering/Marine Engineering/Materials Science and Engineering/Mechanical Engineering/Mechanical and Automation Engineering/ Mechatronics Engineering/Medical Electronics/Petrochemical Engineering/ Production Engineering/Robotics and Automation Engineering/Bio-Technology/ Chemical Engineering/Chemical and Electrochemical Engineering/Fashion Technology/Food Technology/Handloom and Textile Technology/Information Technology/Petrochemical Technology/Petroleum Engineering/Pharmaceutical Technology/Plastic Technology/ Polymer Technology/Textile Chemistry/Textile Technology)
(Regulations 2013)

Time : Three Hours | Maximum : 100 Marks

Answer ALL questions.

PART – A (10×2=20 Marks)

1. Write on nitrogen cycle.
2. Define endangered species.
3. Mention two invasive species.
4. What are in-situ and ex-situ conservation ?
5. What is called endemic species ?
6. What is mitigation ?
7. What is a nuclear holocaust ?

8. What is child abuse ?

9. What is a watershed ?

10. Write on EIA.

PART – B (5×13=65 Marks)

11. a) Discuss uniqueness of different ecosystems : Forest ecosystem, grassland ecosystem, desert ecosystem and aquatic ecosystem.

(OR)

b) Which are the biodiversity hotspots in India ? What are the threats they face ?

12. a) Discuss the human-animal conflict with special reference to media coverage.

(OR)

b) Discuss physical, chemical and biological parameters to ensure drinking water quality.

13. a) How could we tackle fertilizer-pesticide problems in modern agriculture ?

(OR)

b) Discuss the renewable sources of energy with respect to solar, wind and hydel power.

14. a) Write on some of the significant Acts related to environment.

(OR)

b) Discuss the 12 principles of Green Chemistry.

15. a) Discuss the linkages among population explosion, development and environment.

(OR)

b) Elucidate the role of GIS and remote sensing in environment and health.

PART – C (1×15=15 Marks)

16. a) India is a Mega-diversity nation. Explain in detail about this statement. Explain the in-situ and ex-situ conservation of biodiversity.

(OR)

b) Explain in detail about the various clauses of Biomedical waste (Management and handling) Rules 1998.

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26/11/18 (Fn)

Reg. No. : | | | | | | | | | | | | |

Question Paper Code : 20632

B.E./B.Tech. DEGREE EXAMINATION, NOVEMBER/DECEMBER 2018.

Third/Fourth/Fifth/Sixth/Seventh/Eighth/Ninth Semester

Civil Engineering

GE 6351 – ENVIRONMENTAL SCIENCE AND ENGINEERING

(Common to all branches Expect Marine Engineering)

(Regulations 2013)

[Also Common to PTGE 6351 — Environmental Science and Engineering for B.E. (Part-Time) Third Semester — Civil Engineering and Second Semester – Mechanical Engineering – Regulations 2014]

Time : Three hours Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. What is a bio-diversity hotspot? Give examples.

2. What is an endangered species? Mention with suitable examples.

3. Define acid rain.

4. Define oxygen cycle.

5. What is habitat fragmentation?

6. What is desertification?

7. Define e-waste.

8. Define sustainable development.

9. What is population explosion?

10. Write about Environmental Impact Analysis (EIA).

PART B — (5 × 13 = 65 marks)

11. (a) What is bio-diversity? Discuss the unique advantages of bio-diversity.

Or

(b) Discuss the man-wildlife conflict in India with cases from recent incidents.

12. (a) What are the causes and control measures for air pollution and soil pollution?

Or

(b) Discuss the measures that should be taken to de-pollute our waterways.

13. (a) Discuss the merits and de-merits of constructing big dams.

Or

(b) Write on the pros and cons of some of the renewable energy resources.

14. (a) Give the salient features of some of the laws related to environment.

Or

(b) Discuss some natural disasters and the measures to be taken to cope with them.

15. (a) Write notes on HIV/AIDS including its prevention measures.

Or

(b) Discuss the role of information technology in environmental sciences.

PART C — (1 × 15 = 15 marks)

16. (a) Discuss the desirable changes in lifestyle that will help conserve the environment.

Or

(b) Discuss mitigation and adaptation measures with regard to climate change.

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Reg. No. : | | | | | | | | | | | | |

Question Paper Code : 71947

B.E./B.Tech. DEGREE EXAMINATION, APRIL/MAY 2017.

Third/Fourth/Fifth/Sixth/Seventh/Eighth Semester

Mechanical Engineering

GE 6351 – ENVIRONMENTAL SCIENCE AND ENGINEERING

(Common to Aeronautical Engineering, Agriculture Engineering, Automobile Engineering, Biomedical Engineering, Civil Engineering, Computer Science and Engineering, Electrical and Electronics Engineering, Electronics and Communication Engineering, Electronics and Instrumentation Engineering, Environmental Engineering, Geoinformatics Engineering, Industrial Engineering, Industrial Engineering and Management, Instrumentation and Control Engineering, Manufacturing Engineering, Marine Engineering, Materials Science and Engineering, Mechanical and Automation Engineering, Mechatronics Engineering, Medical Electronics Engineering, Petrochemical Engineering, Production Engineering, Robotics and Automation Engineering, Bio technology, Chemical Engineering, Chemical and Electrochemical Engineering, Fashion Technology, Food Technology, Handloom and Textile Technology, Information Technology, Petrochemical Technology, Petroleum Engineering, Pharmaceutical Technology, Plastic Technology, Polymer Technology, Textile Chemistry, Textile Technology)

(Regulations 2013)

Time : Three hours Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. What do you understand by 'species biodiversity'? Give one example.
2. How is nitrogen fixed in soil?
3. What are the characteristics of PAN?
4. Mention the effects of nuclear wastes in humans.
5. Give any two reasons for marine pollution.
6. Write any two problems caused by high saline soils.

7. How is cyclone formed?

8. When does rehabilitation arise? Mention any one problem to government during rehabilitation.

9. What is meant by value education?

10. Mention any two welfare programs for children adopted in India.

PART B — (5 × 13 = 65 marks)

11. (a) (i) Explain the structure and function of grassland eco system. (6)

(ii) Substantiate the statement, 'India is a megadiversity nation'. (7)

Or

(b) (i) Write the importance of biological hazard in the environment. (6)

(ii) Explain the methods of conservation of biodiversity. (7)

12. (a) (i) How is noise pollution controlled? (6)

(ii) Write a detailed note on photo chemical reactions taking place in the atmosphere. (7)

Or

(b) (i) What are the effects of heavy metals in aquatic environment. (6)

(ii) What is a particulate matter? How is it controlled by using equipment? (7)

13. (a) (i) What are the reasons of deforestation? (6)

(ii) How is biogas generated? (7)

Or

(b) Explain in detail the effect of modern agriculture which includes both beneficial and adverse effects. (13)

14. (a) What is green chemistry? Explain the various principles of green chemistry with suitable examples. (13)

Or

(b) Explain the features of the following :

(i) Air Act

(ii) Forest conservation Act. (13)

15. (a) Describe the following : (13)

(i) Environment and human health relation.

(ii) HIV and AIDS.

Or

(b) What do you mean by environmental impact analysis? What are the methods followed for EIA? (13)

PART C — (1 × 15 = 15 marks)

16. (a) Enlist the rules of management and handling biomedical waste and analyse critically the problems associated with the implementation.

Or

(b) Analyse the environmental effects of extracting and using mineral resources and write the remedies taken.

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Reg. No. :

Question Paper Code : 41186

B.E./B.Tech. DEGREE EXAMINATION, APRIL/MAY 2018
Third/Fourth/Fifth/Sixth/Seventh/Eighth/Nineth Semester
Mechanical Engineering
GE 6351 – ENVIRONMENTAL SCIENCE AND ENGINEERING

(Common to Mechanical Engineering (Sandwich) Aeronautical Engineering/ Agricultural Engineering/Automobile Engineering/Biomedical Engineering/ Civil Engineering/ Computer Science and Engineering/Electrical and Electronics Engineering/Electronics and Communication Engineering/Electronics and Instrumentation Engineering/Environmental Engineering/Geoinformatics Engineering/Industrial Engineering/Industrial Engineering and Management/ Instrumentation and Control Engineering/Manufacturing Engineering/Marine Engineering/Materials Science and Engineering/Mechanical Engineering/ Mechanical and Automation Engineering/Mechatronics Engineering/Medical Electronics/Petrochemical Engineering/Production Engineering/Robotics and Automation Engineering/Bio Technology/Chemical Engineering/Chemical and Electrochemical Engineering/Fashion Technology/Food Technology/Handloom and Textile Technology/Information Technology/Petrochemical Technology/Petroleum Engineering/Pharmaceutical Technology/Plastic Technology/Polymer Technology/ Textile Chemistry/Textile Technology)
(Regulations 2013)

Time : Three Hours | Maximum : 100 Marks

Answer ALL questions.

PART – A (10×2=20 Marks)

1. Define 'keystone species' with suitable example.
2. What are indicator species ? Give example.
3. Define 'noise pollution'.
4. What are mitigation procedures ? Give example.

5. Define the term 'man induced landslide'.

6. What is bioconversion of pollutants ? Give example.

7. What are biomedical wastes ? Give example.

8. Define the term 'environmental ethics'.

9. What is population explosion ?

10. Define 'GIS-remote sensing'.

PART – B (5×13=65 Marks)

11. a) i) What are ecological succession processes ? Explain in detail.

ii) Explain the desert and grassland ecosystem in details.

(OR)

b) i) Explain any ten control measures man-wildlife conflicts in detail.

ii) Explain the conservation of biodiversity via in-situ and ex-situ in detail.

12. a) i) What are the roles of individual in prevention of pollution ? Explain

ii) What is the various water treatment processes ? Explain any two.

(OR)

b) i) Explain the term 'marine pollution' and nuclear hazards in detail.

ii) What are ozones ? Explain their functions and depletion mechanism.

13. a) i) Explain the exploitation of mineral resources with two case studies.

ii) Explain the role of an individual in conservation of natural resources.

(OR)

b) i) Explain the energy conversion process with suitable examples

ii) What is biochemical degradation of pollutants ? Explain.

14. a) i) Explain the 12 principles of Green Chemistry.

ii) What are resettlement and rehabilitation of people ? Explain.

(OR)

b) i) Explain the roles of state and central pollution control board .

ii) Explain Wildlife Protection Act and Forest Conservation Act in detail.

15. a) i) Explain any ten role of information technology in human health.

ii) How to give value education on HIV/AIDS ? Explain.

(OR)

b) i) What are the woman and child welfare programme available in India ? Explain in detail.

ii) What are the family welfare programmes available ? Explain.

PART – C **(1×15=15 Marks)**

16. Give a case study of any anthropogenic (Man-made) pollution disaster (s) known to you and discuss the effects of these on the environment (including the human populations) in which they happened.

Reg. No. : | | | | | | | | | | | | |

13.4.19

AN

Question Paper Code : 53129

B.E./B.Tech. DEGREE EXAMINATIONS, APRIL/MAY 2019.

Third/Fourth/Fifth/Sixth/Seventh/Eighth/Ninth Semester

Civil Engineering

GE 6351 — ENVIRONMENTAL SCIENCE AND ENGINEERING

(Common to Mechanical Engineering (Sandwich)/Aeronautical Engineering/Agriculture Engineering/Automobile Engineering/Biomedical Engineering/Computer Science and Engineering/Electrical and Electronics Engineering/Electronics and Communication Engineering/Electronics and Instrumentation Engineering/Environmental Engineering/Geoinformatics Engineering/Industrial Engineering/Industrial Engineering and Management/Instrumentation and Control Engineering/Manufacturing Engineering/Marine Engineering/Materials Science and Engineering/Mechanical Engineering/Mechanical and Automation Engineering/Mechatronics Engineering/Medical Electronics/Petrochemical Engineering/Production Engineering/Robotics and Automation Engineering/Bio Technology/Chemical Engineering/Chemical and Electrochemical Engineering/Fashion Technology/ Food Technology/Handloom and Textile Technology/Information Technology/ Petrochemical Technology/Petroleum Engineering/Pharmaceutical Technology/Plastic Technology/Polymer Technology/Textile Chemistry/ Textile Technology)

(Regulation 2013)

Time : Three hours | Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. Where from the word environment is derived and what does it refer to?
2. Write the criteria to determine hotspot and name the hot spots in India.
3. Classify the pollution types.
4. List the effects of acid rain.
5. What are the impacts of overgrazing?
6. Define eutrophication.
7. State the environmental ethics.

8. Mention the objectives of waste land reclamation.

9. How population density is calculated?

10. What is Geographic Information System (GIS)?

PART B — (5 × 13 = 65 marks)

11. (a) (i) Describe the structure and functions of grassland ecosystem. (7)

(ii) Discuss the two approaches of wildlife conservation in protected habitats. (6)

Or

(b) (i) Mention the role of an individual in conservation of natural resources. (7)

(ii) With a neat diagram. discuss the energy flow in ecosystem. (6)

12. (a) Discuss the various sources, effects and control measures of soil and marine pollution. (13)

Or

(b) (i) Discuss the ozone chemistry with neat diagram. (7)

(ii) Explain the role of an individual in prevention of pollution. (6)

13. (a) Explain, how construction of dams affects forests and tribal people. (13)

Or

(b) Discuss in detail about solar form of renewable energy sources. (13)

14. (a) (i) Elaborate on the approaches for sustainable development. (7)

(ii) Depict the process of rainwater harvesting and mention its objectives. (6)

Or

(b) (i) Discuss the features of wildlife conservation act and forest conservation act. (7)

(ii) Write about climate change and global warming. (6)

15. (a) (i) Write short notes on various rights of human. (7)

(ii) Explain how value education plays a key role in shaping children. (6)

Or

(b) (i) Discuss the various family welfare programs implemented by state and central governments. (7)

(ii) Throw light on the interlink between environment and human health. (6)

PART C — (1 × 15 = 15 marks)

16. (a) Provide a recent case study of how information technology played an important role in environment and health at the time of natural disaster.

Or

(b) Explain the various unit operations and processes involved in water treatment with the help of a neat sketch.

20/11/17 - FN

Reg. No. : | | | | | | | | | | | | |

Question Paper Code : 50779

B.E./B.Tech. DEGREE EXAMINATION, NOVEMBER/DECEMBER 2017
Third Semester
Civil Engineering
MA 6351 – TRANSFORMS AND PARTIAL DIFFERENTIAL EQUATIONS

(Common to Mechanical Engineering (Sandwich)/ Aeronautical Engineering/ Agriculture Engineering/ Automobile Engineering/ Biomedical Engineering/ Computer Science and Engineering/ Electrical and Electronics Engineering/ Electronics and Communication Engineering/ Electronics and Instrumentation Engineering/ Geoinformatics Engineering/ Industrial Engineering/ Industrial Engineering and Management/ Instrumentation and Control Engineering/ Manufacturing Engineering/ Marine Engineering/ Materials Science and Engineering/Mechanical Engineering/Mechanical and Automation Engineering/ Mechatronics Engineering/ Medical Electronics/ Petrochemical Engineering/ Production Engineering/ Robotics and Automation Engineering/ Biotechnology, Chemical Engineering/ Chemical and Electrochemical Engineering/ Food Technology/ Information Technology/ Petrochemical Technology/ Petroleum Engineering/ Plastic Technology/Polymer Technology)
(Regulations 2013)

Time : Three Hours | Maximum : 100 Marks

Answer ALL questions.

PART – A (10×2=20 Marks)

1. Find the partial differential equation by eliminating the arbitrary function 'f' from the relation $z = f(x^2 - y^2)$.

2. Find the complete integral of $\sqrt{p} + \sqrt{q} = 1$.

3. State Dirichlet's conditions for a given function f(x) to be expanded in Fourier series.

4. Write the complex form of Fourier series for a function f(x) defined in $-l < x < l$.

5. What is the basic difference between the solutions of one dimensional wave equation and one dimensional heat equation ?

6. State any two solutions of the Laplace equation $u_{xx} + u_{yy} = 0$ involving exponential terms in x or y.

7. If F [f(x)] = F(s), then find F[f(ax)].

8. State the convolution theorem for Fourier transforms.

9. Find the Z-transform of the function f(n) = 1/n.

10. Form the difference equation by eliminating arbitrary constant 'a' from $y_n = a.\ 2^n$.

PART – B (5×16=80 Marks)

11. a) i) Find the singular integral of $z = px + qy + p^2 - q^2$. (8)

ii) Find the general integral of $(x - 2z)\ p + (2z - y)\ q = y - x$. (8)

(OR)

b) Solve the following equations.

i) $(D^2 + 2DD' + D'^2)\ z = e^{x-y} + xy$ (8)

ii) $(D^2 - 5DD' + 6D'^2)\ z = y \sin x$. (8)

12. a) i) Find the Fourier series for a function $f(x) = x + x^2$ in $(-\pi, \pi)$ and hence deduce the value of $\frac{1}{1^2} + \frac{1}{2^2} + \frac{1}{3^2} + \ldots\ldots$ (8)

ii) Find the Fourier series of y = f(x) up to first harmonic which is defined by the following data in $(0, 2\pi)$: (8)

x	0	$\pi/3$	$2\pi/3$	π	$4\pi/3$	$5\pi/3$	2π
f(x)	1	1.4	1.9	1.7	1.5	1.2	1

(OR)

b) i) Find the half-range cosine series for $f(x) = x$ in $(0, \pi)$. Hence deduce the value of $\frac{1}{1^2} + \frac{1}{3^2} + \frac{1}{5^2} + \ldots.$ (8)

ii) Find the Fourier series for a function $f(x) = \begin{cases} l - x, & 0 < x \le l \\ 0, & l < x \le 2l \end{cases}$ in $(0, 2l)$. (8)

13. a) A tightly stretched string of length l has its end fastened at $x = 0$, $x = l$. At $t = 0$, the string is in the form $f(x) = kx(l - x)$ and then released. Find the displacement at any point of the string at a distance x from one end and at any time $t > 0$. **(16)**

(OR)

b) A rod of length l cm has its ends A and B kept at 0°C and 100°C respectively, until steady state conditions prevail. If the temperature at B is suddenly reduced to 0°C and maintained at 0°C, find the temperature distribution u(x, t) at a distance x from A at any time t. **(16)**

14. a) i) If $F_S(s)$ and $F_C(s)$ denote Fourier sine and cosine transform of a function f(x) respectively, then show that

$$F_S\{f(x) \sin ax\} = \frac{1}{2}\{F_C(s-a) - F_C(s+a)\} \quad \textbf{(4)}$$

ii) Find the Fourier transform of a function $f(x) = \begin{cases} 1-|x| & \text{if } -1 < x < 1 \\ 0, & \text{otherwise} \end{cases}$ and hence find the value of $\int_0^\infty \frac{\sin^4 t}{t^4} dt$ by Parseval's identity. **(12)**

(OR)

b) Find the Fourier sine and cosine transforms of a function $f(x) = e^{-x}$. Using Parseval's identity, evaluate :

(1) $\int_0^\infty \frac{dx}{(x^2+1)^2}$ and (2) $\int_0^\infty \frac{x^2 dx}{(x^2+1)^2}$ **(16)**

15. a) i) Find the Z-transform of $\frac{2n+3}{(n+1)(n+2)}$. **(8)**

ii) Find $Z^{-1}\left[\frac{z^2}{\left(z-\frac{1}{2}\right)\left(z-\frac{1}{4}\right)}\right]$ by using convolution theorem. **(8)**

(OR)

b) i) Find the inverse Z-transform of $\frac{z^3}{(z-1)^2(z-2)}$ by method of partial fraction. **(6)**

ii) Solve the difference equation $y(n+2) - 7y(n+1) + 12y(n) = 2^n$, given that $y(0) = 0$ and $y(1) = 0$, by using Z-transform. **(10)**

26/11/18

Reg. No. : | | | | | | | | | | | | |

Question Paper Code : 20751

B.E./B.Tech. DEGREE EXAMINATION, NOVEMBER/DECEMBER 2018.

Third Semester

Civil Engineering

MA 6351 — TRANSFORMS AND PARTIAL DIFFERENTIAL EQUATIONS

(Common to All Branches)

(Regulations 2013)

Time : Three hours Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. Form the partial differential equation by eliminating the arbitrary constants a and b from $z = (x-a)^2 + (y-b)^2 + 1$.

2. Find the complete integral of $p + q = x + y$.

3. Write the complex form of Fourier series in the interval $0 < x < 2\pi$.

4. Find the Root mean square value of the function $f(x) = x - x^2$ in $-1 < x < 1$.

5. Solve $yu_x + xu_y = 0$ using separation of variables method.

6. What are the possible solutions of the one dimensional heat flow equation?

7. State Fourier integral theorem.

8. Prove that $F[f(ax)] = \frac{1}{a} F\left(\frac{s}{a}\right)$, $a > 0$.

9. Find $Z\left[\cos\left(\frac{n\pi}{2}\right)\right]$.

10. State initial and final value theorem for Z-transforms.

PART B — (5 × 16 = 80 marks)

11. (a) (i) Form the partial differential equation by eliminating the arbitrary functions f and g from $z = f(ax + by) + g(\alpha x + \beta y)$. (8)

(ii) Find the general solution of $x(z^2 - y^2)p + y(x^2 - z^2)q = z(y^2 - x^2)$. (8)

Or

(b) (i) Solve $z^2(p^2 + q^2) = x^2 + y^2$. (8)

(ii) Find the general solution of $(D^2 - 6DD' + 5D'^2)z = e^x \sinh y + xy$. (8)

12. (a) (i) Find the Fourier series expansion of $f(x) = x + x^2$ in $-\pi < x < \pi$ and hence deduce the value of $\frac{1}{1^2} + \frac{1}{2^2} + \frac{1}{3^2} + \ldots\ldots\infty$. (8)

(ii) Find the Fourier series expansion of $f(x) = 2x - x^2$ in $0 < x < 3$. (8)

Or

(b) (i) Find the Fourier cosine series expansion of $f(x) = x \sin x$ in $0 < x < \pi$ and hence deduce the value of $1 + \frac{2}{1.3} - \frac{2}{3.5} + \frac{2}{5.7} + \ldots\infty$. (8)

(ii) Compute the first two harmonics of the Fourier series of f(x) from the table : (8)

x	30°	60°	90°	120°	150°	180°	210°	240°	270°	300°	330°	360°
$f(x)$	2.34	3.01	3.68	4.15	3.69	2.20	0.83	0.51	0.88	1.09	1.19	1.04

13. (a) A string is stretched tightly between $x = 0$ and $x = 20$ is fastened at both ends. The midpoint of the string is taken to a height and then released from rest in that position. Find the displacement of any point x of the string at any time t. (16)

Or

(b) A square plate is bounded by the lines $x = 0$, $y = 0$, $x = 20$ and $y = 20$. Its faces are insulated. The temperature along the upper horizontal edge is given by $u(x, 20) = x(20 - x)$ when $0 < x < 20$ while the other three edges are kept at 0°C. Find the steady state temperature in the plate. (16)

14. (a) (i) Find the Fourier Transform of $f(x)$ if $f(x) = \begin{cases} 1 - |x|, & |x| < 1 \\ 0, & |x| > 1 \end{cases}$ and hence evaluate the integral $\int_0^\infty \left(\frac{\sin t}{t}\right)^4 dt$. (10)

(ii) State and prove convolution theorem for Fourier transforms. (6)

Or

(b) (i) Evaluate $\int_0^\infty \frac{dx}{(x^2+a^2)(x^2+b^2)}$ using transforms. (6)

(ii) Find the Fourier cosine transform of $f(x) = e^{-a^2x^2}$ and hence find $F_S[xe^{-a^2x^2}]$. (10)

15. (a) (i) Find $Z\left[\frac{1}{(n+1)(n+2)}\right]$. (8)

(ii) Using convolution theorem evaluate $Z^{-1}\left[\frac{8z^2}{(2z-1)(4z+1)}\right]$. (8)

Or

(b) (i) Using Z – Transform solve $y(n+3)-3y(n+1)+2y(n)=0$, with $y(0)=4$, $y(1)=0$, $y(2)=8$. (8)

(ii) Find $Z^{-1}\left[\frac{z}{(z-1)(z^2+1)}\right]$ by using integral method. (8)

Reg. No. : | | | | | | | | | | | | |

Question Paper Code : 72068

B.E./B.Tech. DEGREE EXAMINATION, APRIL/MAY 2017.

Third Semester

Mechanical Engineering

MA 6351 — TRANSFORMS AND PARTIAL DIFFERENTIAL EQUATIONS

(Common to Mechanical Engineering (Sandwich)/Aeronautical Engineering/ Agriculture Engineering/Automobile Engineering/B.E. Biomedical Engineering/ B.E. Civil engineering/B.E. Computer Science and Engineering/Electrical and Electronics Engineering/Electronics and Communication Engineering/Electronics and Instrumentation Engineering/Geoinformatics Engineering/Industrial Engineering/Industrial Engineering and Management/Instrumentation and Control Engineering/Manufacturing Engineering/Marine Engineering/Materials Science and Engineering/Mechanical and Automation Engineering/Mechatronics Engineering/Medical Electronics Engineering/Petrochemical Engineering/ Production Engineering/Robotics and Automation Engineering/ Biotechnology/ Chemical Engineering/Chemical and Electrochemical Engineering/Food Technology/Information Technology/Petrochemical Technology/Petroleum Engineering/Plastic Technology/Polymer Technology)

(Regulations 2013)

Time : Three hours

Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. Form the partial differential equation by eliminating arbitrary function 'f' from $z = e^{ay} f(x + by)$.

2. Solve $(D^3 - D^2D' - 8DD'^2 + 12D'^3)z = 0$.

3. State the sufficient condition for a function $f(x)$ to be expressed as a Fourier series.

4. If the Fourier series of the function $f(x) = x + x^2$, in the interval $(-\pi, \pi)$ is $\frac{\pi^2}{3} + \sum_{n=1}^{\infty}(-1)^n\left[\frac{4}{n^2}\cos nx - \frac{2}{n}\sin nx\right]$, then find the value of the infinite series $\frac{1}{1^2} + \frac{1}{2^2} + \frac{1}{3^2} + \ldots$

5. Write all possible solutions of one dimensional heat equation $\frac{\partial u}{\partial t} = \alpha^2 \frac{\partial^2 u}{\partial x^2}$.

6. Using the method of separation of variables, solve $\frac{\partial u}{\partial x} = 2\frac{\partial u}{\partial t} + u$ where $u(x, 0) = 6e^{-3x}$.

7. If $F(s)$ is the Fourier transform of $f(x)$, prove that $F\{f(x-a)\} = e^{ias}F(s)$.

8. Find Fourier Sine transform of $\frac{1}{x}$.

9. Find the Z-transform of a^n.

10. State initial and final value theorems on Z-transforms.

PART B — (5 × 16 = 80 marks)

11. (a) (i) Find the general solution of $(z^2 - 2yz - y^2)p + (xy + zx)q = xy - zx$. (8)

(ii) Find the general solution of $(D^2 + 2DD' + D'^2)z = x^2 y + e^{x-y}$. (8)

Or

(b) (i) Find the general solution of $z = px + qy + p^2 + pq + q^2$. (8)

(ii) Find the general solution of $(D^2 - 3DD' + 2D'^2 + 2D - 2D')z = \sin(2x + y)$. (8)

12. (a) (i) Find the Fourier series of period 2π for the function $f(x) = x\cos x$ in $0 < x < 2\pi$. (8)

(ii) Find the Fourier series expansion for $y = f(x)$ up to second harmonic from the following data: (8)

x:	0	1	2	3	4	5
y:	9	18	24	28	26	20

Or

(b) (i) Find the Fourier half-range cosine series of $f(x) = \begin{cases} x, & \text{in } 0 < x < 1 \\ 2 - x, & \text{in } 1 < x < 2 \end{cases}$ (8)

(ii) Find the complex form of the Fourier series of $f(x) = e^{-ax}$ in, $-l < x < l$. (8)

13. (a) A tightly stretched string of length $2l$ is fastened at $x=0$ and $x=2l$. The midpoint of the string is then taken to height 'b' transversely and then released from rest in that position. Find the lateral displacement of the string. (16)

Or

(b) A rectangular plate with insulated surfaces is 20 cm wide and so long compared to its width that it may be considered infinite in length without introducing an appreciable error. If the temperature while the other short edge $x=0$ is given by $u=\begin{cases}10y & \text{for } 0\le y\le 10\\ 10(20-y) & \text{for } 10\le y\le 20\end{cases}$ and the two long edges as well as the other short edge are kept at 0°c, find the steady state temperature distribution $u(x,y)$ in the plate. (16)

14. (a) Find the Fourier transform of $f(x)$ given by $f(x)=\begin{cases}1 & \text{for } |x|<2\\ 0 & \text{for } |x|>2\end{cases}$ and hence evaluate $\int_0^\infty \frac{\sin x}{x}dx$ and $\int_0^\infty \left(\frac{\sin x}{x}\right)^2 dx$. (16)

Or

(b) (i) Find the Fourier cosine transform of $e^{-a^2x^2}$ for any $a>0$. (8)

(ii) Evaluate $\int_0^\infty \frac{dx}{(x^2+1)(x^2+4)}$ using Fourier transforms. (8)

15. (a) (i) Find Z-transform of $\frac{2n+3}{(n+1)(n+2)}$. (8)

(ii) Using Convolution theorem, find $Z^{-1}\left[\frac{8z^2}{(2z-1)(4z+1)}\right]$. (8)

Or

(b) (i) Find $Z^{-1}\left[\frac{4z^3}{(2z-1)^2(z-1)}\right]$, by the method of partial fractions. (8)

(ii) Using Z-transforms, solve the equation $y_{n+2}-7y_{n+1}+12y_n=2^n$, given that $y_0=y_1=0$. (8)

04/05/19 FN

Reg. No. : | | | | | | | | | | | | |

Question Paper Code : 53248

B.E./B.Tech. DEGREE EXAMINATIONS, APRIL/MAY 2019.

Third Semester

Civil Engineering

MA 6351 — TRANSFORMS AND PARTIAL DIFFERENTIAL EQUATIONS

(Common to Mechanical Engineering (Sandwich)/Aeronautical Engineering/Agriculture Engineering/Automobile Engineering/Biomedical Engineering/Computer Science and Engineering/Computer and Communication Engineering/Electrical and Electronics Engineering/Electronics and Communication Engineering/Electronics and Instrumentation Engineering/Geoinformatics Engineering/Industrial Engineering/ Industrial Engineering and Management/Instrumentation and Control Engineering/Manufacturing Engineering/Marine Engineering/Materials Science and Engineering/Mechanical Engineering/Mechanical and Automation Engineering/Mechatronics Engineering/Medical Electronics/Petrochemical Engineering/Production Engineering/Robotics and Automation Engineering/Bio Technology/Chemical Engineering/Chemical and Electrochemical Engineering/Food Technology/Information Technology/Petrochemical Technology/Petroleum Engineering/Plastic Technology/Polymer Technology)

(Regulation 2013)

Time : Three hours Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. Form the partial differential equation by eliminating the arbitrary function f from $z = f\left(\frac{y}{x}\right)$.

2. Find the complete solution of the partial differential equation $\sqrt{p} + \sqrt{q} = 1$.

3. State Dirichlet condition for existence of Fourier series.

4. If $(\pi - x)^2 = \frac{\pi^2}{3} + 4\sum_{n=1}^{\infty} \frac{\cos nx}{n^2}$, in $0 < x < 2\pi$, then deduce the value of $\sum_{n=1}^{\infty} \frac{1}{n^2}$.

5. Classify the following partial differential equation $u_{xx} + u_{xy} + u_{yy} = 0$.

6. What are the possible solutions of the one dimensional heat flow equation.

7. Find the Fourier sine transform of e^{-ax}.

8. Define self reciproeal function under Fourier transform with example.

9. Find the Z transform of a constant 'a'.

10. If $Z\{f(n)\} = \frac{z^2}{z^2+1}$, then find $f(0)$, using initial value theorem.

PART B — ($5 \times 16 = 80$ marks)

11. (a) (i) Find the singular solution of $z = px + qy + p^2q^2$. (8)

(ii) Solve $(D^2 - 2DD')z = x^3y + e^{2x}$. (8)

Or

(b) (i) Find the complete solution of $p^2 + q^2 = x^2 + y^2$. (8)

(ii) Find the general solution of $(y - z)p + (z - x)q = (x - y)$. (8)

12. (a) (i) Find the Fourier series of $f(x) = x^2$ in $-\pi < x < \pi$. (8)

(ii) Find the half range sine series expansion of $x(\pi - x)$ in $0 < x < \pi$. (8)

Or

(b) (i) Compute the first two harmonics of the Fourier series of $f(x)$ from the table given (8)

x	0	$\pi/3$	$2\pi/3$	π	$4\pi/3$	$5\pi/3$	2π
$f(x)$	1.0	1.4	1.9	1.7	1.5	1.2	1.0

(ii) Obtain the Fourier cosine series expansion of $f(x) = x$ in $0 < x < l$. (8)

Reg. No. : | | | | | | | | | | | | |

Question Paper Code : 50387

B.E./B.Tech. DEGREE EXAMINATION, NOVEMBER/DECEMBER 2017

Fourth/Fifth/Sixth Semester

Computer Science and Engineering

CS 6401 – OPERATING SYSTEMS

(Common to : Electronics and Communication Engineering/Electronics and Instrumentation Engineering/Instrumentation and Control Engineering/Medical Electronics/Information Technology)

(Regulations 2013)

Maximum : 100 Marks

Time : Three Hours

Answer ALL questions

PART – A (10×2=20 Marks)

1. Mention the objectives of an operating systems.
2. What is SYSGEN and system boot ?
3. Name and draw five different process states with proper definition.
4. Elucidate mutex locks with its procedure.
5. Write about swapping. Let us assume the user process is of size 1MB and the backing store is a standard hard disk with a transfer rate of 5MBPS. Calculate the transfer rate.
6. Consider the following page-reference string :

   1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12.

   How many page faults and page fault ratio would occur for the FIFO page replacement algorithm ? Assuming there is four frames.
7. Suppose that the disk rotates at 7200 rpm.
   a) What is the average rotational latency of the disk drive ?
   b) Identify seek distance can be covered in the time ?

8. Enlist different types of directory structure.

9. List the advantages of Linux OS.

10. Write the purpose of using virtualization.

PART – B (5×13=65 Marks)

11. a) Explain Cache memory and its mapping. (13)

(OR)

b) Describe evolution of operating system. (13)

12. a) i) What is a process ? Discuss components of process and various states of a process with the help of a process state transition diagram. (8)

ii) Write the difference between user thread and kernel thread. (5)

(OR)

b) i) What is the average turnaround time for the following processes using

a) FCFS (3)

b) SJF non-preemptive. (3)

c) Preemptive SJF. (3)

Process	Arrival Time	Burst Time
P1	0.0	8
P2	0.4	4
P3	1.0	1

ii) With example elucidate livelock. (4)

13. a) Draw the diagram of segmentation memory management scheme and explain its principle. (13)

(OR)

b) When do page faults occur ? Consider the reference string :

1, 2, 3, 4, 2, 1, 5, 6, 2, 1, 2, 3, 7, 6, 3, 2, 1, 2, 3, 6.

How many page faults and page fault rate occur for the FIFO, LRU and optimal replacement algorithms, assuming one, two, three, four page frames ? (13)

14. a) i) In a variable partition scheme, the operating system has to keep track of allocated and free space. Suggest a means of achieving this. Describe the effects of new allocations and process terminations in your suggested scheme. (5)

ii) What are different allocation methods in disk storage ? Explain with neat sketch. (8)

(OR)

b) Consider a disk queue with requests for I/O to blocks on cylinders

98, 183, 37, 122, 14, 124, 65, 67

If the disk head is start at 53, then find out the total head movement with respect to FCFS, SSTF, SCAN, C-SCAN and LOOK scheduling. (13)

15. a) i) Explain the components of Linux system with neat sketch. (6)

ii) Write the various system administrator roles in LINUX OS. (7)

(OR)

b) i) How to install and configuring network services in LINUX. (9)

ii) Describe the benefits of virtualization in LINUX OS. (4)

(1×15=15 Marks)

PART – C

16. a) Consider the following system snapshot using data structures in the Banker's algorithm, with resources A, B, C and D and process P0 to P4 :

	Max	Allocation	Need	Available	
	A B C D	A B C D		A B C D	A B C D
P0	6 0 1 2	4 0 0 1			3 2 1 1
P1	1 7 5 0	1 1 0 0			
P2	2 3 5 6	1 2 5 4			
P3	1 6 5 3	0 6 3 3			
P4	1 6 5 6	0 2 1 2			

Using Banker's algorithm, answer the following questions :

a) How many resources of type A, B, C and D are there ? (2)

b) What are the contents of the need matrix ? (3)

c) Is the system in a safe state ? Why ? (3)

d) If a request from process P4 arrives for additional resources of (1, 2, 0, 0,), can the Banker's algorithm grant the request immediately ? Show the new system state and other criteria. (7)

(OR)

b) i) Consider the atomic fetch-and-set x, y instruction unconditionally sets the memory location x to 1 and fetches the old value of x in y without allowing any intervening access to the memory location x. Consider the following implementation of P and V functions on a binary semaphore.

```
void P (binary_semaphore *s) {
unsigned y;
unsigned *x = & (s- > value);
do {
  fetch-and-set x, y;
} while (y);
}
void V (binary_semaphore *s) {
 S- >value = 0;
}
```

Write whether the implementation may or may not work if context switching is disabled in P. (4)

ii) Consider a situation where we have a file shared between many people.

If one of the people tries editing the file, no other person should be reading or writing at the same time, otherwise changes will not be visible to him/her.

However if some person is reading the file, then others may read it at the same time.

a) What kind of situation is this ? (3)

b) Consider the following problem parameters to solve this situation. (8)

Problem parameters :

1) One set of data is shared among a number of processes.
2) Once a writer is ready, it performs its write. Only one writer may write at a time.
3) If a process is writing, no other process can read it.
4) If at least one reader is reading, no other process can write.
5) Readers may not write and only read.

Reg. No. : | | | | | | | | | | | | |

Question Paper Code : 20363

B.E./B.Tech. DEGREE EXAMINATION, NOVEMBER/DECEMBER 2018.

Fourth Semester

Computer Science and Engineering

CS 6401 – OPERATING SYSTEMS

(Common to Electronics and Communication Engineering, Electronics and Instrumentation Engineering, Instrumentation and Control Engineering, Medical Electronics and Information Technology)

(Regulations 2013)

(Also common to PTCS 6401 — Operating System B.E. (Part-Time) Third Semester Computer Science and Engineering – Regulations 2014)

Time : Three hours

Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. Some computer systems do not provide a privileged mode of operation in hardware. Is it possible to construct a secure operating system for these computer systems?

2. Can traps be generated intentionally by a user program? If so, for what purpose?

3. What is the meaning of the term busy waiting?

4. Can a multithreaded solution using multiple user-level threads achieve better performance on a multiprocessor system than on a single-processor system?

5. Under what circumstances would a user be better off using a timesharing system rather than a PC or single-user workstation?

6. State the effect of Thrashing in an operating system.

7. Mention the significance of LDT and GDT in segmentation.

8. List the major attributes and operations of a file system.

9. Do FAT file system advantageous? Justify your answer.

10. Mention the importance of a Kernel in LINUX Operating system.

PART B — (5 × 13 = 65 marks)

11. (a) (i) Explain the various types of system calls with an example for each. (8)

(ii) Discuss the functionality of system boot with respect to an Operating System. (5)

Or

(b) Discuss the essential properties of the following types of systems (4)

(i) Time sharing systems. (4)

(ii) Multi-processor systems. (5)

(iii) Distributed Systems.

12. (a) (i) Explain why interrupts are not appropriate for implementing synchronization primitives in multiprocessor systems. (7)

(ii) Compute the average waiting time for the processes using non-preemptive SJF scheduling algorithm. (5)

Process	Arrival time	Burst time
P_1	0.0	7
P_2	2.0	4
P_3	4.0	1
P_4	5.0	4

Or

(b) Discuss how the following pairs of scheduling criteria conflict in certain settings.

(i) CPU utilization and response time. (4)

(ii) Average turnaround time and maximum waiting time. (5)

(iii) I/O device utilization and CPU utilization. (4)

13. (a) Compare paging with segmentation in terms of the amount of memory required by the address translation structures in order to convert virtual addresses to physical addresses.

Or

(b) Most systems allow programs to allocate more memory to its address space during execution. Data allocated in the heap segments of programs is an example of such allocated memory. What is required to support dynamic memory allocation in the following schemes?

(i) Contiguous memory allocation (4)

(ii) Pure segmentation (5)

(iii) Pure paging. (4)

14. (a) Consider a file system where a file can be deleted and its disk space reclaimed while links to that file still exist. What problems may occur if a new file is created in the same storage area or with the same absolute path name? How can these problems be avoided?

Or

(b) Illustrate an application that could benefit from operating system support for random access to indexed files.

15. (a) UNIX coordinates the activities of the kernel I/O components by manipulating shared in-kernel data structures, whereas Windows NT uses object-oriented message passing between kernel I/O components. Discuss three pros and three cons of each approach.

Or

(b) Discuss virtualization techniques used in different operating systems.

PART C — ($1 \times 15 = 15$ marks)

16. (a) Which of the following scheduling algorithms could result in starvation?

(i) First-come, first-served (5)

(ii) Shortest job first (5)

(iii) Round robin (5)

Detail with Justification.

Or

(b) Outline a solution using semaphores to solve dinning philosopher problem. (15)

Reg. No. : | | | | | | | | | | | | |

Question Paper Code : 91397

B.E./B.Tech. DEGREE EXAMINATIONS, NOVEMBER/DECEMBER 2019

Fourth/Fifth/Sixth Semester

CS6401 – OPERATING SYSTEMS

(Common to : Computer Science and Engineering/Electronics and Communication Engineering/Electronics and Instrumentation Engineering/Instrumentation and Control Engineering/Medical Electronics/Information Technology)

(Regulations 2013)

(Also Common to PTCS 6401 – Operating Systems – for Third Semester Computer Science and Engineering – Regulations 2014)

Time : Three Hours | Maximum : 100 Marks

Answer ALL questions

PART – A (10×2=20 Marks)

1. What are the pros and cons of Microkernals Operating system Structures ?
2. Why it is important for scheduler to distinguish I/O bound programs from CPU bound programs ?
3. List out the various process states available.
4. What is semaphore ? Explain the two primitive operations of a semaphore.
5. State the differences between static and dynamic memory allocation.
6. When does a page fault occur ? Explain various page replacement strategies/ algorithms.
7. Suppose that a disk drive has 5000 cylinders, numbered 0 to 4999. The drive is currently serving a request at cylinder 143 and the previous was at cylinder 125. The queue of pending requests, in FIFO order is: 86, 1470, 913, 1774, 948, 1509, 1022, 1750, 130. Starting from the current head position, what is the total distance (in cylinders) that the disk arm moves to satisfy all the pending requests for SCAN.
8. What type of file accessing method can be used for batch and payroll applications ?
9. Define latency, transfer and seek time with respect to disk I/O.
10. List out the features of Linux OS.

PART – B (5×13=65 Marks)

11. a) Describe the features of the following types of operating systems structures 13

i) MS-DOS Layer Structure

ii) Layered Approach

iii) Microkernel System Structure

iv) Modules.

(OR)

b) What are system calls ? How do system calls help user programs to interact with the OS ? Explain.

12. a) Assume some OS needs to schedule four processes using different scheduling algorithms. For each process, the following information shows its burst time (processing time), priority (The lower the number, the higher the priority) and arrival time. 14

Processes	Burst Time	Priority	Arrival Time
P1	12	3	0
P2	6	4	2
P3	4	1	4
P4	18	2	6

What is the Average Waiting Time of those processes for each of the following schedule algorithms ? (Draw a Gantt Chart for each algorithm.) 15

i) First Come First Serve (FCFS)

ii) Non-preemptive Shortest Job First (NP-SJF)

iii) Preemptive Shortest Job First (P-SJF)

iv) Priority Scheduling

v) Round-Robin (scheduling time quantum is 5 time units)

(OR)

b) What is a critical section ? Explain readers and writers problem with semaphore.

13. a) A computer system has a 36-bit virtual address space with a page size of 8 K, and 4 bytes per page table entry.

i) How many pages are in the virtual address space ?

ii) What is the maximum size of addressable physical memory in this system ?

iii) If the average process size is 8 GB, would you use a one-level, two-level or three-level page table. Why ?

(OR)

b) Explain the following with example :

i) Thrashing (6)

ii) Page replacement algorithm. (7)

14. a) Consider a disk with a rotational rate of 10,000 RPM, an average seek time of 8 ms, and an average of 500 sectors per track. Estimate the average time to read a random sector from disk. Do this by summing the estimates of the seek time, rotational latency and transfer time.

(OR)

b) Elaborate on the various File allocation methods.

15. a) A multicore processor is said to be sequentially consistent if all loads and stores appear to occur in some global total order that is consistent with program order in every core. Sadly, most modern processors are not sequentially consistent: memory accesses can appear to occur in different orders from the perspective of different cores or even in circular order

i) Give a possible reason why different cores might see stores in different orders.

ii) All non-sequentially consistent machines provide special (expensive) instructions that can, when desired, be used to force a memory access to be seen everywhere at once, after all previous accesses of the same core and before all subsequent accesses of the same core. Suggest how the programmer, language, and/or compiler might use such instructions to achieve the illusion of sequential consistency.

(OR)

b) Discuss how the following pairs of scheduling criteria conflict in certain settings.

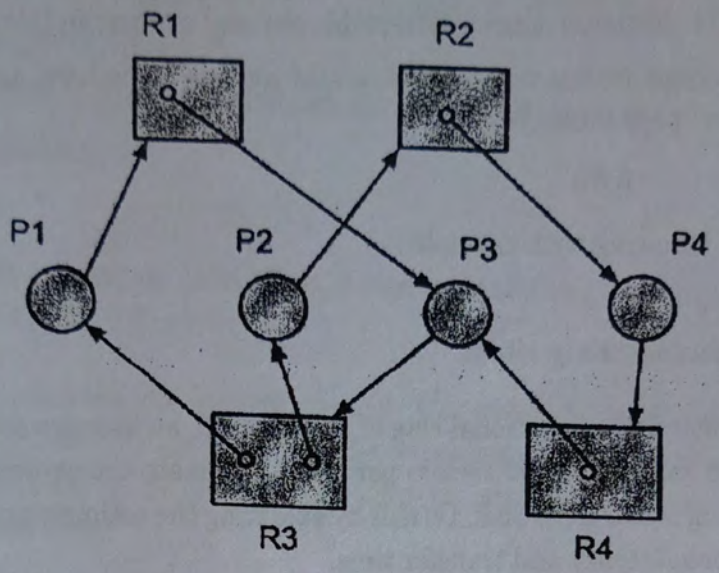
i) CPU utilization and response time

ii) Average turnaround time and maximum waiting time

iii) I/O device utilization and CPU utilization.

PART – C (1×15=15 Marks)

16. a) Consider the following resource allocation graph :



Determine if there is a deadlock. If so, indicate the processes and resources involved. Show how the deadlock can be resolved through addition of resources. If not, argue why this is the case, i.e. there is no deadlock. In either case, provide a feasible sequence of processes to show completion.

(OR)

b) Explain in detail how UNIX Virtual File System has been Implemented.

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Reg. No. : | | | | | | | | | | | | |

Question Paper Code : 71678

B.E./B.Tech. DEGREE EXAMINATION, APRIL/MAY 2017

Fourth/Fifth/Sixth Semester

Computer Science and Engineering

CS 6401 — OPERATING SYSTEMS

(Common Electronics and Communication Engineering, Electronics and Instrumentation Engineering, Instrumentation and Control Engineering, Medical Electronics Engineering, Information Technology)

(Regulations 2013)

Time : Three hours Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. Consider a memory system with a cache access time of 10 ns and a memory access time of 110 ns — assume the memory access time includes the time to check the cache. If the effective access time is 10% greater than the cache access time, what is the hit ratio H?

2. What are the objectives of operating systems?

3. "Priority inversion is a condition that occurs in real time systems where a low priority process is starved because higher priority processes have gained hold of the CPU" — Comment on this statement.

4. Differentiate single threaded and multi-threaded processes.

5. What is the difference between a user-level instruction and a privileged instruction? Which of the following instructions should be privileged and only allowed to execute in kernel mode?

   (a) Load a value from a memory address to a general-purpose register.

   (b) Set a new value in the program counter (PC) register.

   (c) Turn off interrupts.

6. Will optimal page replacement algorithm suffer from Belady's anomaly? Justify your answer.

7. Suppose that the disk rotates at 7200 rpm.
What is the average rotational latency of the disk drive?

8. Differentiate between file and directory.

9. Mention any two features of Linux file systems.

10. Enlist the advantages of using kernel modules in Linux.

PART B — (5 × 13 = 65 marks)

11. (a) (i) Explain the concept of multiprocessor and Multicore organization. (7)

(ii) Discuss about direct memory access. (6)

Or

(b) (i) Explain the various structures of an operating system. (8)

(ii) Describe system calls and system programs in detail with neat sketch. (5)

12. (a) Consider the following set of processes, with the length of the CPU — burst time in given ms:

Process	Burst Time	Arrival time
P1	8	0.00
P2	4	1.001
P3	9	2.001
P4	5	3.001
P5	3	4.001

Draw four Gantt charts illustrating the execution of these processes using FCFS, SJF, priority and RR (quantum=2) scheduling. Also calculate waiting time and turnaround time for each scheduling algorithms. (13)

Or

(b) What is a race condition? Explain how a critical section avoids this condition. What are the properties which a data item should possess to implement a critical section? Describe a solution to the Dining philosopher problem so that no races arise. (13)

13. (a) Discuss the given Memory Management techniques with diagrams

(i) Partition Allocation Methods. (7)

(ii) Paging and Translation Look-aside Buffer. (6)

Or

(b) (i) Describe about free space management on I/O buffering and blocking. (7)

(ii) Discuss the concept of buddy system allocation with neat sketch. (6)

14. (a) (i) Discuss about the various file access methods. (7)

(ii) With neat sketch explain about the

(1) Directory structure

(2) File sharing (6)

Or

(b) (i) Explain about Kernel I/O subsystem and transforming I/O to hardware operations. (7)

(ii) On a disk with 1000 cylinders, numbers 0 to 999, compute the number of tracks the disk arm must move to satisfy the entire request in the disk queue. Assume the last received was at track 345 and the head is moving towards track 0. The queue in FIFO order contains requests for the following tracks. 123, 874, 692, 475, 105 and 376. Find the seek length for the following scheduling algorithm.

(1) SSTF (2) LOOK (3) CSCAN (6)

15. (a) Explain the concepts of domain name system and multifunction server. (13)

Or

(b) Write short notes on LINUX kernel and virtualization with neat sketch. (13)

PART C — (1 × 15 = 15 marks)

16. (a) What do you mean by term synchronization? What is Semaphore? Explain how semaphore can used as synchronization tool. Consider a coke machine that has 10 slots. The producer is the delivery person and the consumer is the student using the machine. It uses the following three semaphores:

semaphore mutex

semaphore fullBuffer /* Number of filled slots */

semaphore emptyBuffer /* Number of empty slots */

(i) Write pseudo code for delivery_person( ) and student( )

(ii) What will be the initial values of the semaphores?

(iii) Write a solution that guarantees the mutual exclusion and has no deadlocks.

Or

(b) What is deadlock? What are the necessary conditions for deadlock to occur? Explain the deadlock prevention method of handling deadlock.

Consider the following information about resources in a system.

(i) There are two classes of allocatable resource labeled R1 and R2

(ii) There are two instances of each resource

(iii) There are four processes labeled p1 through p4

(iv) There are some resource instances already allocated to processes as follows:

- One instance of R1 held by p2, another held by p3
- One instance of R2 held by p1, another held by p4

(v) Some processes have requested additional resources, as follows:

- p1 wants one instance of R1
- p3 wants one instance of R2

(1) Draw the resource allocation graph for this system

(2) What is the state (runnable, waiting) of each process? For each process that is waiting indicate what it is waiting for.

(3) Is this system deadlocked? If so, state which processes are involved. If not, give an execution sequence that eventually ends, showing resource acquisition and release at each step.

Reg. No. : | | | | | | | | | | | | |

Question Paper Code : 40907

B.E./B.Tech. DEGREE EXAMINATION, APRIL/MAY 2018

Fourth Semester

Computer Science and Engineering

CS6403 – SOFTWARE ENGINEERING

(Regulations 2013)

Time : Three Hours | Maximum : 100 Marks

Answer ALL questions

PART – A (10×2=20 Marks)

1. What is Software ? List its characteristics.
2. If you have to develop a word processing software product, what process model will you choose ? Justify your answer.
3. What are the various types of traceability in software engineering ?
4. Compare prototyping approaches in a software process.
5. List the principles of software design.
6. What UI design patterns are used for the following ?
7. What are the testing principles the software engineer must apply while performing the software testing ?
8. Distinguish between verification and validation.
9. What is EVA ?
10. Identify the type of maintenance for each of the following :
    a) correcting the software faults
    b) adapting the change in environment.

40907

(5×13=65 Marks)

PART – B

11. a) Explain how work break down structure is used in software engineering. Discuss how software project scheduling helps in timely release of a product.

(OR)

b) Which software process model is good for risk management ? Explain the model. Describe how the model is used to layout the objectives, risks and plans for quality improvement.

12. a) What is requirements elicitation ? Briefly describe the various activities performed in requirements elicitation phase with an example of a watch system that facilitates to set time and alarm.

(OR)

b) What is SRS ? Explain in detail the various components of an SRS.

13. a) What is software architecture ? Describe the different software architectural styles with examples.

(OR)

b) Explain in detail types of cohesion and coupling with examples.

14. a) i) Consider the pseudocode for simple subtraction given below : (9)

1) Program 'Simple Subtraction'
2) Input (x, y)
3) Output (x)
4) Output (y)
5) If x > y then DO
6) x – y = z
7) Else y – x = z
8) EndIf
9) Output (z)
10) Output "End Program".

Perform basis path testing and generate test cases.

ii) Explain top down integration testing with an example. (4)

(OR)

b) Write notes on :

i) regression testing
ii) refactoring
iii) debugging.

15. a) i) Describe in detail COCOMO model for software cost estimation. (9)

ii) If Team A found 342 errors prior to release of software and Team B found 182 errors. What additional measures and metrics are needed to find out if the teams have removed the errors effectively ? Explain. (4)

(OR)

b) Discuss the process of function point analysis. Explain function point analysis with sample cases for components of different complexity.

PART – C (1×15=15 Marks)

16. a) What is the purpose of DFD ? What are the components of DFD ? Construct DFD for the following system :

An on-line shopping system for XYZ provides many services and benefits to its members and staffs. Currently, XYZ staffs manually handle the purchasing information with the use of basic office software, such as Microsoft Office Word and Excel. It may results in having mistakes easily and the process is very inconvenient. XYZ needs an online shopping system at their Intranet based on the requirements of users. XYZ online shopping system has five key features :

i) to provide the user friendly online shopping cart function to members to replace hardcopy ordering form;

ii) to store inventory and sales information in database to reduce the human mistakes, increase accuracy and enhance the flexibility of information processing;

iii) to provide an efficient inventory system which can help the XYZ staffs to gain enough information to update the inventory;

iv) to be able to print invoices to members and print a set of summary reports for XYZ's internal usage;

v) to design the system that is easy to maintain and upgrade.

(OR)

b) Consider the problem of determining the number of different words in an input file. Carry out structured design by performing transform and transaction analysis construct the structured chart.

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Reg. No. : | | | | | | | | | | | | |

Question Paper Code : 52862

B.E./B.Tech. DEGREE EXAMINATIONS, APRIL/MAY 2019.

Fourth/Fifth/Sixth Semester

Computer Science and Engineering

CS 6401 – OPERATING SYSTEMS

(Common to Electronics and Communication Engineering/Electronics and Instrumentation Engineering/Instrumentation and Control Engineering/Medical Electronics/Information Technology)

(Regulation 2013)

(Also common to PTCS 6401 – Operating Systems for B.E. (Part-Time) for Third Semester – Computer Science and Engineering – Regulations 2014)

Time : Three hours Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. Define operating system. Name the objectives of operating systems.

2. Elucidate system boot.

3. When a process creates a new process using the fork ( ) operation, which of the following state is shared between the parent process and the child process?

   (a) Stack

   (b) Heap

   (c) Shared memory segments.

4. What resources are used when a thread is created? How do they differ from those used when a process is created?

5. Under what circumstances do page faults occur? Describe the actions taken by the operating system when a page fault occurs.

6. Consider a logical address space of eight pages of 1024 words each, mapped onto a physical memory of 32 frames.

   (a) How many bits are there in the logical address?

   (b) How many bits are there in the physical address?

7. Why do some systems keep track of the type of a file, while others leave it to the user or simply do not implement multiple file types? Which system is "better?"

8. Why is it advantageous for the user for an operating system to dynamically allocate its internal tables? What are the penalties to the operating system for doing so?

9. The Linux kernel does not allow paging out of kernel memory. What effect does this restriction have on the kernel's design?

10. List down the benefits of virtualization.

PART B — (5 × 13 = 65 marks)

11. (a) (i) List five services provided by an operating system. Explain how each provides convenience to the users. (8)

(ii) Explain also in which cases it would be impossible for user-level programs to provide these services. (5)

Or

(b) Describe evolution of operating system. (13)

12. (a) (i) Write the difference between user thread and kernel thread. (8)

(ii) Palm OS provides no means of concurrent processing. Discuss three major complications that concurrent processing adds to an operating system. (5)

Or

(b) (i) What is the average turnaround time for the following processes using

(1) FCFS

(2) SJF non-preemptive

(3) Preemptive SJF. (9)

Process	Arrival Time	Burst Time
P1	0.0	8
P2	0.4	4
P3	1.0	1

(ii) With example elucidate livelock. (4)

13. (a) Draw the diagram of segmentation memory management scheme and explain its principle. (13)

Or

(b) When do page faults occur? Consider the reference string:

1, 2, 3, 4, 2, 1, 5, 6, 2, 1, 2, 3, 7, 6, 3, 2, 1, 2, 3, 6.

How many page faults and page fault rate occur for the FIFO, LRU and Optimal replacement algorithms, assuming one, two, three, four page frames? (13)

14. (a) (i) In a variable partition scheme, the operating system has to keep track of allocated and free space. Suggest a means of achieving this. Describe the effects of new allocations and process terminations in your suggested scheme. (5)

(ii) Consider a file currently consisting of 100 blocks. Assume that the file control block (and the index block, in the case of indexed allocation) is already in memory. Calculate how many disk I/O operations are required for contiguous, linked, and indexed (single-level) allocation strategies, if, for one block, the following conditions hold. In the contiguous-allocation case, assume that there is no room to grow in the beginning, but there is room to grow in the end. Assume that the block information to be added is stored in memory.

(1) The block is added at the beginning.

(2) The block is added in the middle.

(3) The block is added at the end.

(4) The block is removed from the beginning.

(5) The block is removed from the middle.

(6) The block is removed from the end. (8)

Or

(b) Consider a disk queue with requests for I/O to blocks on cylinders

98, 183, 37, 122, 14, 124, 65, 67

If the disk head is start at 53, then find out the total head movement with respect to FCFS, SSTF, SCAN, C-SCAN and LOOK scheduling. (13)

15. (a) (i) Explain the Components of Linux System with neat sketch. (6)

(ii) Write the Various System Administrator Roles in LINUX OS. (7)

Or

(b) How to Install and Configuring Network Services in LINUX?

PART C — (1 × 15 = 15 marks)

16. (a) (i) Consider the following system snapshot using data structures in the Banker's algorithm, with resources A, B, C, and D, and process P0 to P4:

	Max	Allocation	Need	Available
	ABCD	ABCD	ABCD	ABCD
P0	6012	4001	????	3211
P1	1750	1100		
P2	2356	1254		
P3	1653	0633		
P4	1656	0212		

Using Banker's algorithm, answer the following questions.

(1) What are the contents of the Need matrix? (2)

(2) Is the system in a safe state? Why? (3)

(3) If a request from process P4 arrives for additional resources of (1,2,0,0,), Can the Banker's algorithm grant the request immediately? Show the new system state and other criteria.(4)

(ii) Consider a demand-paged computer system where the degree of multiprogramming is currently fixed at four. The system was recently measured to determine utilization of CPU and the paging disk. The results are one of the following alternatives. For each case, what is happening? Can the degree of multiprogramming be increased to increase the CPU utilization? Is the paging helping?

(1) CPU utilization 13 percent; disk utilization 97 percent

(2) CPU utilization 87 percent; disk utilization 3 percent

(3) CPU utilization 13 percent; disk utilization 3 percent. (6)

Or

(b) Explain in detail about

(i) File allocation methods. (6)

(ii) Process synchronization in OS. (9)

Reg. No. : | | | | | | | | | | | | |

Question Paper Code : 50389

B.E./B.Tech. DEGREE EXAMINATION, NOVEMBER/DECEMBER 2017

Fourth Semester

Computer Science and Engineering

CS 6403 – SOFTWARE ENGINEERING

Common to : Information Technology

(Regulations 2013)

Time : Three Hours | Maximum : 100 Marks

Answer ALL questions

PART – A (10×2=20 Marks)

1. Write the IEEE definition of software engineering.
2. Why LOC is not a better metric to estimate a software ?
3. Draw a use case diagram for an online shopping which should provide provisions for registering, authenticating the customers and also for online payment through any payment gateway like paypal.
4. Define Quality Function Development (QFD).
5. Write a note on FURPS model.
6. Draw the context flow graph of a ATM automation system.
7. Mention the purpose of stub and Driver used for testing.
8. Define verification and validation testing.
9. List out the principles of project scheduling.
10. Write a note on Risk Information Sheet (RIS).

(5×13=65 Marks)

PART – B

11. a) i) What is the impact of reusability in software development process ? (4)

ii) Explain the component based software development model with a neat sketch. (9)

(OR)

b) i) Write a note on the unique characters of a software. (3)

ii) What is the significance of the spiral model when compared with other models. (3)

iii) Explain the CMMI model to assess the organization level. (7)

12. a) i) What is feasibility study ? How it helps in requirement engineering process ? (3)

ii) How will you classify the requirement types for a project, give example. (3)

iii) List the stake holders and all types of requirements for an online train reservation system. (7)

(OR)

b) Consider the process of ordering a pizza over the phone. Draw the use case diagram and also sketch the activity diagram representing each step of the process, from the moment you pick up the phone to the point where you start eating the pizza. Include activities that others need to perform. Add exception handling to the activity diagram you developed. Consider at least two exceptions (e.g. delivery person wrote down wrong address, deliver person brings wrong pizza). (13)

13. a) Discuss about the design concepts in a software development process. (13)

(OR)

b) Discuss about User Interface Design of a Software with an example and neat sketch. (13)

14. a) Consider the following program segment.

```
/* num is the number the function searches in a presorted integer array arr */
int bin_search (int num)
{
int min, max; min = 0; max = 100;
while (min! = max) {
if (arr[(min + max)/2] > num)
max = (min + max)/2;
else if(arr[(min + max)/2]
```

```
min = (min + max)/2;
else return ((min + max)/2);
}
return(– 1);
}
```

i) Draw the control flow graph for this program segment. (2)

ii) Define cyclomatic complexity. (2)

iii) Determine the cyclomatic complexity for this program. (Show the intermediate steps in your computation. Writing only the final result is not sufficient) (9)

(OR)

b) i) Explain how the various types of loops are tested. (9)

ii) Differentiate black box and white box testing. (4)

15. a) Explain in detail about the risk management in a software development life cycle. (13)

(OR)

b) i) Discuss about COCOMO II model for software estimation. (8)

ii) Explain about the factors that cause difficulty in testing a software. (5)

PART – C (1×15=15 Marks)

16. a) List out the various umbrella activities which support software development process and discuss about their necessity in maintaining the quality in both software process and product that is being developed for railway reservation system. (15)

(OR)

b) Model a data flow diagram for a "Library Management System". State the functional requirements you are considering. (15)

Reg. No. : | | | | | | | | | | | | |

Question Paper Code : 20365

B.E./B.Tech. DEGREE EXAMINATION, NOVEMBER/DECEMBER 2018.

Fourth Semester

Computer Science and Engineering

CS 6403 — SOFTWARE ENGINEERING

(Common to Information Technology)

(Regulations 2013)

(Also common to PTCS 6403 – Software Engineering B.E. (Part-Time) Fourth Semester – Computer Science and Engineering–Regulations 2014)

Time : Three hours Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. List the characteristics of a software.

2. Name the umbrella activities in software process.

3. Draw a use case diagram for an online shopping which should provide provisions for registering, authenticating the customers and also for online payment through any payment gateway like paypal.

4. Write a brief note on Petri Nets.

5. Mention the design quality model proposed by hewlett packard.

6. Draw the zero level data flow diagram of an ATM system.

7. What is meant by regression testing?

8. Define verification, validation testing and debugging.

9. Enumerate the factors that influence a project schedule

10. What is a Risk Information Sheet (RIS)?

PART B — (5 × 13 = 65 marks)

11. (a) Assume that you are the technical manager of a software development organization. A client approached you for a software solution. The problems stated by the client have uncertainties which lead to loss if it is not planned and Solved. What software development model you will suggest for this project? Justify. Explain that model with a neat sketch along with its pros and cons.

Or

(b) (i) Draw the layered architecture of software engineering. (3)

(ii) What are the merits and demerits of using formal methods for developing a software? (3)

(iii) Explain the CMMI model to assess the organization level. (7)

12. (a) (i) What is feasibility study? How it helps in requirement engineering process? (3)

(ii) How will you classify the requirement types for a project? Give example. (3)

(iii) List the stake holders and all types of requirement for an online train reservation system. (7)

Or

(b) Consider the process of ordering a pizza over the phone. Draw the *use case diagram* and also sketch the *activity diagram* representing each step of the process, from the moment you pick up the phone to the point where you start eating the pizza. Include activities that others need to perform. Add exception handling to the activity diagram you developed. Consider atleast two exceptions (e.g. delivery person wrote down wrong address, deliver person brings wrong pizza). (13)

13. (a) Explain the steps involved in conducting component level design when it is applied for object-oriented system. (13)

Or

(b) Discuss about User Interface Design of a Software with an example and neat sketch. (13)

14. (a) Explain the process of unit testing and integration testing. (13)

Or

(b) (i) Explain how various types of loops are tested. (9)

(ii) Differentiate black box and white box testing. (4)

15. (a) (i) Explain the steps involved in project planning. (10)

(ii) Discuss about various factors that affect a project plan. (3)

Or

(b) (i) Discuss how Earned Value Analysis (EVA) helps to track a project quantitatively. (8)

(ii) Explain about the factors that cause difficulty in testing a software. (5)

PART C — (1 × 15 = 15 marks)

16. (a) What is risk? How will you define and categorize it and what are the various risks that will happen from initialization phase of a software development to product delivery. Also explain how will you manage those risk in various phases. (15)

Or

(b) For any problem of your choice (say for example stock monitoring system or key word frequency vector or key word in context that is used in Information Retrieval system), design atleast four different architectural design solutions using four different architectural styles. Compare these solutions based on atleast three quality attributes. Note that the problem can be of your choice, the example given need not be considered.

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Reg. No. : | | | | | | | | | | | | |

Question Paper Code : 91399

B.E./B.Tech. DEGREE EXAMINATIONS, NOVEMBER/DECEMBER 2019

Fourth Semester

Computer Science and Engineering

CS 6403 – SOFTWARE ENGINEERING

(Common to Information Technology)

(Regulations 2013)

(Also common to PTCS 6403 – Software Engineering for B.E. (Part-Time) – Fourth Semester – Computer Science and Engineering – Regulations 2014)

Time : Three Hours | Maximum : 100 Marks

Answer ALL questions

PART – A (10×2=20 Marks)

1. Suggest a model to be used when enough staffing is unavailable and why.

2. State the pros and cons of COCOMO model.

3. Identify the notations for requirements specification.

4. State the applications of petri nets.

5. What is the use of fan in and fan out ?

6. Distinguish between class based components and traditional components.

7. How to calculate the reliability of the module ?

8. "Integration testing is harder than unit testing". Justify.

9. Estimate the function point for the below system.

Using the following table for function point weightings :

Factors	Weights		
	Simple	Average	Complex
Number of user inputs	3	4	6
Number of user outputs	4	5	7
Number of user inquiries	3	4	6
Numer of files	7	10	15
Number of external interfaces	5	7	10

A system being developed has the following characteristics :

Number of user inputs	10 (simple)
Number of user outputs	7 (simple)
Number of user inquiries	3 (average)
Number of files	6 (average)
Number of external interfaces	1 (complex)

10. Predict the expected cost for any branch of the decision tree in Make / Buy decision scenario.

PART – B **(5×13=65 Marks)**

11. a) i) Explain the term "Engineering" in Software Engineering. (3)

ii) Describe at least one scenario where 'RAD model would be applicable than not the waterfall model'. (10)

(OR)

b) i) Summarize in detail about risk management. (5)

ii) Elaborate on how LOC and FP can be used in project estimation. (8)

12. a) A software system is to be developed to automate a library catalogue. This system will contain information about all the books in a library and will be usable by library staff and by book borrowers and readers. The system should support catalogue browsing, querying, and should provide facilities allowing users to send messages to library staff reserving a book which is on loan.

For the above specification mention sketch the outline of requirements document as per the lEEE standard format.

(OR)

b) Illustrate in detail about (6)

i) Petri nets (7)

ii) Data Dictionary.

13. a) Outline clearly the concepts and types of coupling and cohesion with examples of each.

(OR)

b) Design and illustrate the user interface design for an webpage advertising underwater submarine.

14. a) Demonstrate the differences between black-box and structural testing and suggest how they can be used together in the defect testing process.

(OR)

b) i) Identify the purpose of regression testing. What are the two main activities of regression testing ? (9)

ii) Why do we need validation testing ? Explain. (4)

15. a) Explain in detail about the various phases, steps and activities that are needed for planning and managing a project with an illustration.

(OR)

b) Describe in detail about :

i) Risk Mitigation, Monitoring and Management Plan (RMMM) (8)

ii) Earned Value Analysis (EVA). (5)

PART – C **(1×15=15 Marks)**

16. a) Given,

Number of user inputs = 15

Number of user outputs = 13

Number of external interfaces = 11

1 function point = 20 LOC (as fourth generation language is used).

Values of constant used in basic COCOMO model. a = 2.4, b = 1.05, c = 2.5, d = 0.38.

Calculate and evaluate the effort and duration using the above details for basic COCOMO model.

(OR)

b) For each of the following types of projects, choose the most appropriate life cycle model and justify your choice by a couple of lines of explanation

i) You are migrating a legacy application in mainframes to Oracle. The project goes through well-defined phases of contract signing, taking each program of the current system with a well-defined acceptance test data, converting it to Oracle and proving that the output matches the expected output. It is not possible to seek intermediate feedback. (8)

ii) You are developing a proof-of-concept to show your prospect on how your product is suited for developing wireless applications. You do not have access to expensive CASE tools. (7)

Reg. No. : | | | | | | | | | | | | |

Question Paper Code : 52864

B.E./B.Tech. DEGREE EXAMINATIONS, APRIL/MAY 2019.

Fourth Semester

Computer Science and Engineering

CS 6403 — SOFTWARE ENGINEERING

(Common to Information Technology)

(Regulation 2013)

(Also common to PTCS 6403 — Software Engineering for B.E. (Part – Time) for Fourth Semester – Computer Science and Engineering – Regulations 2014)

Time : Three hours Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. Differentiate Software engineering methods, tools and procedures.
2. What is EVA?
3. Define Data Dictionary.
4. Classify the following as functional / non-functional requirements for a Timer.
5. List the principles of a software design.
6. Which UI design patterns are used for the following:
   (a) Page layout
   (b) Tables
   (c) Navigation through menus and web pages
   (d) Shopping cart.
7. Distinguish between verification and validation.
8. Distinguish between Alpha and Beta testing.
9. What are the advantages and disadvantages of size measure?
10. For a project XYZ, defects reported by the customer are 5 and internal defects reported are 150. Find the defect leakage.

PART B — (5 × 13 = 65 marks)

11. (a) Which process model would you choose to manufacture a car? Explain the same.

Or

(b) What is function point analysis? Explain the process of project estimation using function points. Explain by considering the following. An ILF consisting of employee information can be updated with EIs that create employee information, delete an employee, or update employee information. An EQ permits display of current employee information. A telephone listing produced monthly, with a calculated total of employees by site, is counted as an EO. The telephone listing includes data retrieved from a personnel file maintained by another application: an EIF. Consider complexity of EO as medium and others as low.

12. (a) What is requirements elicitation? Briefly describe the various activities performed in requirements elicitation phase with an example.

Or

(b) Write the purpose of an SRS? List its components. Discuss in detail the components of SRS for functional requirements.

13. (a) (i) What is coupling? Explain the different types of coupling with examples. (10)

(ii) Consider the following case:

Process control component maintains current data about state of operation. Gets data from multiple sources. Supplies data to multiple sinks. Each source process writes directly to global data store. Each sink process reads directly from global data store.

What type of coupling exists in the system? How can it be over come? (3)

Or

(b) What is software architecture? Describe in detail any three architectural styles giving suitable examples.

14. (a) Consider the pseudocode for simple subtraction given below:

(i) Program 'Simple Subtraction'

(ii) Input (x, y)

(iii) Output (x)

(iv) Output (y)

(v) If $x > y$ then DO.

(vi) $x - y = z$

(vii) Else $y - x = z$

(viii) Endlf

(ix) Output (z)

(x) Output "End Program".

Compute the cyclomatic complexity for the same. Write down the test cases. Perform basis path testing and generate test cases.

Or

(b) What is black box testing? Explain in detail Boundary value analysis with an example.

15. (a) The time estimates (in hours) for the activities of a PERT network are given below:

Activity	t_0	t_m	t_p
1-2	1	1	7
1-3	1	4	7
1-4	2	2	8
2-5	1	1	1
3-5	2	5	14
4-6	2	5	8
5-6	3	6	15

Where t_0 is the optimistic time t_p is the pessimistic time and t_m is most likely time

(i) Draw the project network

(ii) Identify all paths through it and write critical path

(iii) Determine the expected project length.

Or

(b) Describe in detail COCOMO model for software cost estimation. Use it to estimate the effort required to build software for a simple ATM that produces 12 screens, 10 reports and has 80 software components. Assume average complexity and avenge developer maturity. Use application composition model with object points.

PART C — (1 × 15 = 15 marks)

16. (a) What is the purpose of DFD? Explain the components of the DFD. Construct the context diagram, level -0 DFD and level -1 DFD for a salary management system and explain.

Or

(b) Write about make/Buy decision making. Explain it with a scenario.

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Reg. No. : | | | | | | | | | | | | |

Question Paper Code : 20364

B.E./B.Tech. DEGREE EXAMINATION, NOVEMBER/DECEMBER 2018.

Third/Fourth Semester

Computer Science and Engineering

CS 6402 — DESIGN AND ANALYSIS OF ALGORITHMS

(Common to Information Technology)

(Regulations 2013)

Time : Three hours Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. Define algorithm. List the desirable properties of an algorithm.

2. Define best, worst, average case time complexity.

3. What are the differences between dynamic programming and divide and conquer approaches?

4. Give an example for Hamiltonian circuit.

5. Define multistage graphs. Give an example.

6. How dynamic programming is used to solve Knapsack problem?

7. Describe iterative improvement technique.

8. What is solution space? Give an example.

9. Define P and NP problems.

10. Give an example for sum-of-subset problem.

PART B — (5 × 13 = 65 marks)

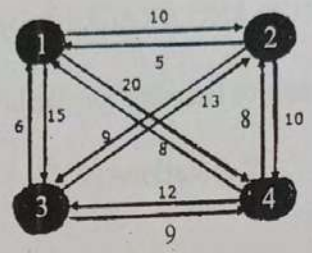
11. (a) (i) Prove that if $g(n)$ is $\Omega(f(n))$ then $f(n)$ is $O(g(n))$. (5)

(ii) Discuss various methods used for mathematical analysis of recursive algorithms. (8)

Or

(b) Write the asymptotic notations used for best case, average case and worst case analysis of algorithms. Write an algorithm for finding maximum element in an array. Give best, worst and average case complexities. (13)

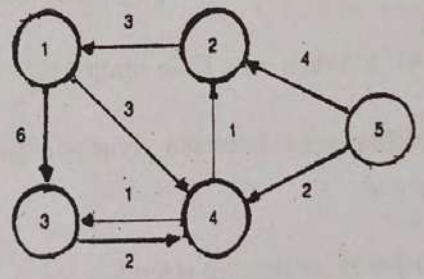
12. (a) Solve travelling salesman problem using brute force approach for the given example. How the solution can be obtained using branch and bound method? (10 + 3)



Or

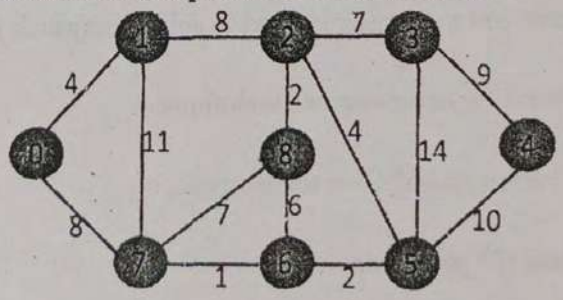
(b) Write the algorithm for quick sort. Provide a complete analysis of quick sort for the given set of numbers 12, 33, 23, 43, 44, 55, 64, 77 and 76. (13)

13. (a) Explain Floyds – Warshall algorithm using dynamic programming. Trace the algorithm for the given example. (13)



Or

(b) Explain how greedy approach is used in Dijkstra's algorithm for finding the single–source shortest paths for the given graph. (13)



14. (a) Illustrate the steps of the simplex methods with an example. (13)

Or

(b) Write the stable marriage algorithm and trace it with an instance. Analyze its running time complexity. (13)

15. (a) Consider the travelling salesperson instance defined by the following cost matrix. (13)

∞	20	30	10	11
15	∞	16	4	2
3	5	∞	2	4
19	6	18	∞	3
16	4	7	16	∞

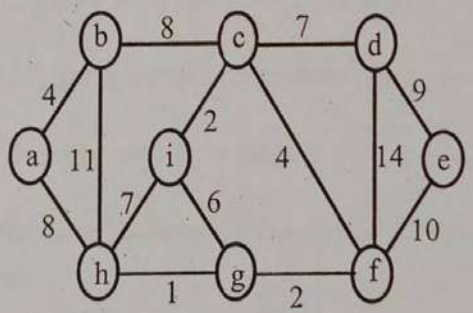
Draw the state space tree and show the reduced matrices corresponding to each of the node.

Or

(b) Discuss the approximation algorithm for NP-hard problems. (13)

PART C — (1 × 15 = 15 marks)

16. (a) Apply the greedy technique to find the minimum spaning tree using Prim's algorithm for the given graph. (15)



Or

(b) Explain the 4-Queen's problem using backtracking. Write the algorithms. Give the estimated cost for all possible solutions of 4-Queen's problem. Specify the implicit and explicit constraints. (15)

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Question Paper Code : 50395

B.E./B.Tech. DEGREE EXAMINATION, NOVEMBER/DECEMBER 2017
Fourth/Fifth/Sixth/Seventh/Eighth Semester
Computer Science and Engineering
CS6551 : COMPUTER NETWORKS
(Common to Biomedical Engineering, Electronics and Communication Engineering, Mechatronics Engineering, Information Technology)
(Regulations 2013)

Time : Three Hours | Maximum : 100 Marks

Answer ALL questions

PART – A (10×2=20 Marks)

1. Define the terms : Bandwidth and Latency.
2. Compare Byte-oriented versus Bit-oriented protocol.
3. Show the Ethernet frame format.
4. Highlight the characteristics of datagram networks.
5. Differentiate between forwarding table and routing table.
6. What is Border Gateway Protocol (BGP) ?
7. Compare flow control versus congestion control.
8. What are the approaches used to provide a range of Quality of Service (QoS) ?
9. Write the use of Hyper Text Transfer Protocol (HTTP).
10. What do you mean by Web Services Description Language (WSDL) ?

PART – B (5×13=65 Marks)

11. a) With a neat sketch, explain the architecture of an OSI seven layer model. (13)

(OR)

b) Discuss the approaches used for error detection in networking. (13)

12. a) Explain the functions of Wi-Fi and Bluetooth in detail. (13)

(OR)

b) i) Explain the datagram forwarding in IP. (7)

ii) Show and explain the ARP packet format for mapping IP addresses into Ethernet addresses. (6)

13. a) With an example, explain the function of link state routing protocol. (13)

(OR)

b) Elaborate on multicast routing protocols. (13)

14. a) i) Draw a TCP state transition diagram for connection management. (7)

ii) Brief about approaches used for TCP congestion control. (6)

(OR)

b) Write a detailed note on congestion avoidance mechanisms used in TCP. (13)

15. a) i) Explain the function of Internet Message Access Protocol (IMAP) with a state diagram. (8)

ii) List and explain the various HTTP request operations. (5)

(OR)

b) i) What is Domain Name System (DNS) ? Explain. (8)

ii) Brief about the importance of Simple Network Management Protocol (SNMP). (5)

PART – C (1×15=15 Marks)

16. a) Outline the steps involved in building a computer network. Give the detailed description for each step. (15)

(OR)

b) For the network given in Figure 1, give global distance – vector tables when

i) Each node knows only the distances to its immediate neighbors. (5)

ii) Each node has reported the information it had in the preceding step to its immediate neighbors. (5)

iii) Step (ii) happens a second time. (5)

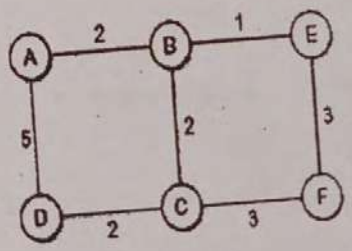

Figure 1

Reg. No. : | | | | | | | | | | | | |

Question Paper Code : 20371

B.E./B.Tech. DEGREE EXAMINATION, NOVEMBER/DECEMBER 2018.

Fourth/Fifth/Sixth/Seventh/Eighth Semester

Computer Science and Engineering

CS 6551 – COMPUTER NETWORKS

(Common to Electronics and Communication Engineering, Mechatronics Engineering, Information Technology, Biomedical Engineering)

(Regulations 2013)

(Also Common to PTCS 6551 – Computer Networks for B.E. (Part-Time) Third Semester – Computer Science and Engineering – Regulations 2014)

Time : Three hours Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. Which layer implements the node to node channel connection in OSI layered architecture?

2. Suppose the following sequence of bits arrives over a link:

   110101111101011111100101111110110. Show the resulting frame after any stuffed bits have been removed. Indicate any errors that might have been introduced into the frame.

3. Suppose you are designing a sliding window protocol for a 1.5 Mbps point-to-point link, which has one way latency of 1.5 seconds. Assuming each frame carries 10 KB of data, what is the minimum number of bits required for the sequence number if SWS = RWS?

4. What details are provided by DHCP other than IP address?.

5. List the two factors that affect the performance of a network switch.

6. Check whether the following IPv6 address notations are correct?

   (a) ::0F53:6382:AB00:67DB:BB27:7332

   (b) 7803:42F2:::88EC:D4BA:B75D:11CD

7. Suppose TCP operates over 10-Gbps link. Assuming TCP could utilize the full bandwidth continuously, how long would it take the sequence numbers to wrap around completely? Is the sequence number space adequate?

8. Define QoS.

9. Consider an HTTP client that wants to retrieve a Web document at a given URL. The IP address of the HTTP server is initially unknown. What transport and application-layer protocols are needed in this scenario?

10. What is the use of SNMP protocol in a network?

PART B — (5 × 13 = 65 marks)

11. (a) (i) List the requirements in building a computer network. (5)

(ii) Suppose a 128-kbps point-to-point link is set up between the Earth and a rover on Mars. The distance from the Earth to Mars (when they are closest together) is approximately 55 Giga meters, and data travels over the link at the speed of light at 3×10^8 m/s.

(1) Calculate the minimum RTT for the link.

(2) Calculate the delay-bandwidth product for the link.

(3) A camera on the rover takes pictures of its surroundings and sends these to Earth. How quickly after a picture is taken can it reach Mission Control on Earth? Assume that each image is 5 Mb in size. (8)

Or

(b) (i) Suppose we want to transmit the message 1011 0010 0111 and protect it from errors using the CRC polynomial $x^4 + x^2 + 1$. Use polynomial long division to determine the message that should be transmitted. Suppose the leftmost bit of the message is inverted due to noise on the transmission link. What is the result of the receiver's CRC calculation? How does the receiver know that an error has occurred? (5)

(ii) Explain the algorithm used for reliable transmission and flow control. (8)

12. (a) (i) Explain the media access control algorithm, CSMA/CD used in Ethernet. Why the same algorithm cannot be used in wireless LAN? (8)

(ii) Consider sending a 2400-byte datagram into a link that has an MTU of 700 bytes. Suppose the original datagram is stamped with the identification number 422. How many fragments are generated? What are the values in the various fields in the IP datagram(s) generated related to fragmentation. (5)

Or

(b) (i) Explain the error reporting using ICMP protocol. How does Traceroute program makes use of ICMP to determine the name and addresses of the routers between source and destination? (7)

(ii) Suppose all of the interfaces in each of three subnets are required to have the prefix 223.1.17/24. Also suppose that Subnet 1 is required to support at least 60 interfaces, Subnet 2 is to support at least 90 interfaces, and Subnet 3 is to support at least 12 interfaces. Provide three network addresses that satisfy these constraints. (6)

13. (a) (i) Explain the link-state algorithm in detail. (5)

(ii) Consider the network shown in Fig 1. Compute the shortest path from C to all other nodes using link-state algorithm. Also update the forwarding table of node C. (8)

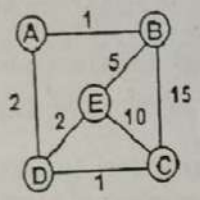

Fig. 1

Or

(b) (i) Briefly explain the Border Gateway Protocol used for Inter domain routing in internetwork. (8)

(ii) Explain multicast routing protocol DVMRP. (5)

14. (a) (i) Explain three ways of connection termination in TCP using state transition diagram. (8)

(ii) Suppose you are hired to design a reliable byte-stream protocol that uses a sliding window (like TCP). This protocol will run over a 50-Mbps network. The RTT of the network is 80 ms, and the maximum segment lifetime is 60 seconds. How many bits would you include in the AdvertisedWindow and SequenceNum fields of your protocol header? (5)

Or

(b) (i) Explain the original, Karn/Patridge and Jacobson/Karel's algorithms of adaptive retransmission in TCP. (8)

(ii) Consider a RED gateway with MaxP = 0.02, and with an average queue length halfway between the two thresholds. Find the drop probability P_{count} for count = 1 and count = 50. Also calculate the probability that none of the first 75 packets is dropped. (5)

15. (a) Explain in detail how electronic mail application is carried out in a network. Also explain the protocols used in this application. (13)

Or

(b) Briefly explain the Domain Name Service protocol with an example. (13)

PART C — (1 × 15 = 15 marks)

16. (a) A student attaches a laptop to campus network and requests/receives a web page from www.google.com. Explain the sequence of operations carried out with the help of different protocols used in application, transport, network and link layers. (15)

Or

(b) (i) How error correction is handled at different layers in an IP network? (9)

(ii) If IP provides connectionless service. How TCP supports connection-oriented service? (6)

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Question Paper Code : 71686

B.E./B.Tech. DEGREE EXAMINATION, APRIL/MAY 2017.

Fourth/Fifth/Sixth/Seventh/Eighth Semester

Computer Science and Engineering

CS 6551 — COMPUTER NETWORKS

(Common to Biomedical Engineering, Electronics and Communication Engineering, Mechatronics Engineering, and Information Technology)

(Regulation 2013)

Time : Three hours Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. Distinguish between packet switched and circuit switched networks.
2. What is meant by bit stuffing? Give an example.
3. State the functions of bridges.
4. When is ICMP redirect message used?
5. How do routers differentiate the incoming unicast, multicast and broadcast IP packets.
6. Why is IPV4 to IPV6 transition required?
7. List the advantages of connection oriented services over connectionless services.
8. How do fast retransmit mechanism of TCP works?
9. State the usage of conditional get in HTTP.
10. Present the information contained in a DNS resource record.

PART B — (5 × 13 = 65 marks)

11. (a) (i) Explain the challenges faced in building a network. (10)

(ii) Obtain the 4-bit CRC code for the data bit sequence 10011011100 using the polynomial $x^4 + x^2 + 1$. (3)

Or

(b) (i) With a protocol graph, explain the architecture of internet. (7)

(ii) Consider a bus LAN with a number of equally spaced stations with a data rate of 9 Mbps and a bus length of 1 km. What is the mean time to send a frame of 500 bits to another station, measured from the beginning of transmission to the end of reception? Assume a propagation speed of 150 m/s. If two stations begin to monitor and transmit at the same time, how long does it need to wait before an interference is noticed? (6)

12. (a) (i) Discuss the working of CSMA/CD protocol. (6)

(ii) Explain the functions of MAC layer present in IEEE 802.11 with necessary diagrams. (7)

Or

(b) (i) Consider sending a 3500-byte datagram that has arrived at a router R_1 that needs to be sent over a link that has an MTU size of 1000 bytes to R_2. Then it has to traverse a link with an MTU of 600 bytes. Let the identification number of the original datagram be 465. How many fragments are delivered at the destination ? Show the parameters associated with each of these fragments. (6)

(ii) Explain the working of DHCP protocol with its header format. (7)

13. (a) Explain in detail the operation of OSPF protocol by considering a suitable network. (13)

Or

(b) Explain the working of Protocol Independent Multi-cast (PIM) in detail. (13)

14. (a) (i) Explain the adaptive flow control and retransmission techniques used in TCP. (8)

(ii) With TCPs slow start and AIMD for congestion control, show how the window size will vary for a transmission where every 5th packet is lost. Assume an advertised window size of 50 MSS. (5)

Or

(b) (i) Explain congestion avoidance using random early detection in transport layer with an example. (7)

(ii) Explain the differentiate services operation of QOS in detail. (6)

15. (a) (i) Describe how SMTP transfers message from one host to another with suitable illustration. (6)

(ii) Explain IMAP with its state transition diagram. (7)

Or

(b) (i) List the elements of network management and explain the operation of SNMP protocol in detail. (8)

(ii) Discuss the functions performed by of DNS. Give example. (5)

PART C — (1 × 15 = 15 marks)

16. (a) (i) Draw the format of TCP packet leader and explain each of its field. (10)

(ii) Specify the justification for having variable field lengths for the fields in the TCP header. (5)

Or

(b) Illustrate the sequence of events and the respective protocols involved while accessing a web page from a machine when it is connected with internet for first time. (15)

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Question Paper Code : 40913

B.E./B.Tech. DEGREE EXAMINATION, APRIL/MAY 2018
Fourth/Fifth/Sixth/Seventh/Eighth Semester
Computer Science and Engineering
CS6551 – COMPUTER NETWORKS
(Common to : Biomedical Engineering/Electronics and Communication Engineering/
Mechatronics Engineering/Information Technology)
(Regulations 2013)

Time : Three Hours

Maximum : 100 Marks

Answer ALL questions

PART – A

(10×2=20 Marks)

1. Write down the requirements to build a computer network.
2. List the metrics that influence the performance of computer networks.
3. Define 802.11.
4. What do you mean by switching ?
5. What are the benefits of Open Shortest Path First (OSPF) protocol ?
6. What is multicast routing ?
7. What are the services provided by Transport layer protocol ?
8. Define congestion control.
9. Write the uses of HTTP.
10. What is DNS ?

PART – B

(5×13=65 Marks)

11. a) With a neat sketch, explain the function of OSI network architecture. **(13)**

(OR)

b) Discuss the different ways to address the framing problem. **(13)**

12. a) i) Show and explain the Ethernet frame format. (7)

ii) Highlight the characteristics of connectionless networks. (6)

(OR)

b) i) Write an algorithm for datagram forwarding in IP. (7)

ii) Show the ARP packet format. (6)

13. a) i) Explain the function of Routing Information Protocol (RIP). (7)

ii) Draw the IPv6 packet header format. (6)

(OR)

b) i) Explain the operation of Protocol-Independent Multicast (PIM). (7)

ii) Outline the need of Distance Vector Multicast Routing Protocol (DVMRP). (6)

14. a) i) Explain how TCP manages a byte stream. (7)

ii) Identify and explain the states involved in TCP. (6)

(OR)

b) i) Explain any one TCP congestion avoidance mechanism. (7)

ii) Brief about the approaches used to provide QoS support. (6)

15. a) Discuss the working of Email in detail. (13)

(OR)

b) i) Tabulate the various HTTP request operations. (7)

ii) Draw the IMAP state transition diagram. (6)

PART – C (1×15=15 Marks)

16. a) Analyse various error detection techniques in transmission of data. (15)

(OR)

b) Elaborate on TCP congestion control mechanisms. Differentiate these mechanisms. (15)

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Reg. No. :

Question Paper Code : 52870

B.E./B.Tech. DEGREE EXAMINATIONS, APRIL/MAY 2019.

Fourth/Fifth/Sixth Semester

Computer Science and Engineering

CS 6551 — COMPUTER NETWORKS

(Common to Biomedical Engineering/Electronics and Communication Engineering/Mechatronics Engineering/Information Technology)

(Regulation 2013)

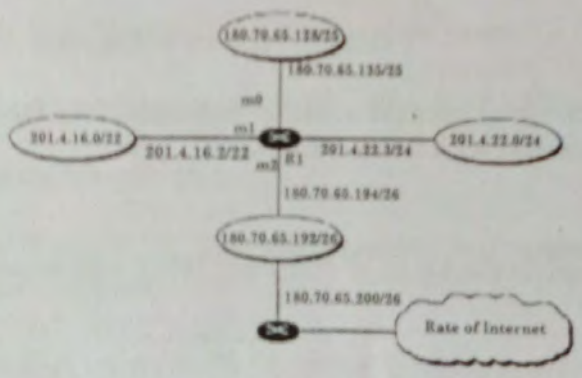
(Also common to PTCS 6551 –Computer Networks for B.E. (Part-Time) – Third Semester – Computer Science and Engineering – Regulation 2014)

Time : Three hours Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. How number of duplex mode link is calculated for mesh topology?
2. What is a URL?
3. What is the need for fragmentation?
4. Draw the frame format of Ethernet.
5. What are the two major mechanisms defined to help transition from IPv4 to IPv6?
6. Make a routing table for the Router R1 using the configuration given in the figure below:



7. How does UDP address flow control mechanism?

8. State the purpose of service model.

9. Draw the scenario of Electronics mail.

10. Draw a diagram that illustrate tunneling strategy.

PART B — (5 × 13 = 65 marks)

11. (a) Explain with relevant diagram the functions of physical and data link layer.

Or

(b) Discuss your understanding of Bit Oriented Protocol namely HDLC.

12. (a) Outline the working principle of Bluetooth technology.

Or

(b) Explain the architecture of IEEE 802.11 Wireless LAN.

13. (a) With an example network scenario explain the mechanism of Routing Information Protocol and specify the routing table contents.

Or

(b) Discuss the fundamentals and advantages of open shortest path first protocol.

14. (a) Explain the congestion control techniques used to improve QOS of the computer network.

Or

(b) (i) Explain the operation of Go-Back-N protocol. (6)

(ii) With a diagram explain about TCP connection management. (7)

15. (a) Discuss in detail about HTTP operation.

Or

(b) Write your understanding on File Transfer Protocol.

PART C — (1 × 15 = 15 marks)

16. (a) Consider a network scenario and explain the functions of ARP and RARP protocols with frame formats.

Or

(b) Explain the basics of POP3 and IMAP mail access protocols.

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Reg. No. : | | | | | | | | | | | | |

Question Paper Code : 80218

B.E./B.Tech. DEGREE EXAMINATIONS, APRIL/MAY 2019.

Fourth Semester

Computer Science and Engineering

MA 8402 — PROBABILITY AND QUEUEING THEORY

(Regulation 2017)

Time : Three hours Maximum : 100 marks

Answer ALL questions.

PART A — ($10 \times 2 = 20$ marks)

1. Let A and B be two events such that $P(A)=\frac{1}{3}$, $P(B)=\frac{3}{4}$ and $P(A \cap B)=\frac{1}{4}$. Compute $P(A/B)$ and $P(\overline{A} \cap \overline{B})$.

2. A random variable X has probability mass function $P(X=x)=\frac{x}{10}$, $x=1, 2, 3, 4$. Find the cumulative distribution function, $F(x)$ of X.

3. The joint probability density function of (X, Y) is $f(x, y)=\begin{cases}4xy, & 0 \le x \le 1,\ 0 \le y \le 1 \\ 0, & \text{otherwise}\end{cases}$. Calculate $P(X \le 2Y)$.

4. State the Central limit theorem for independent and identically distributed random variables.

5. The random process $X(t)$ is defined as $X(t)=e^{-B|t|}$ where B is a random variable uniformly distributed over $[0, 2]$. Is $X(t)$ a first order stationary?

6. Let $\{X_n : n \ge 0\}$ be a Markov chain having state space $S=\{1, 2\}$ and one-step transition probability matrix given by $P=\begin{bmatrix}1 & 0 \\ \frac{1}{2} & \frac{1}{2}\end{bmatrix}$. Find the stationary probabilities of the Markov chain.

7. In an $(M/M/1/\infty):FCFS$ queueing system, the arrival rate is $\lambda=3$ customers/minute and utilization ratio $\rho=0.5$. Find L_s and W_s.

8. In an $(M/M/C/N)\ (C<N)$ FCFS queueing system, write expressions for P_0 and P_N.

9. In an $M/D/1:FCFS$ queueing system, an arrival rate of customers is 10 per second and a service rate of customers is 20 per second. Compute the mean number of customers in the system.

10. Consider a two-station tandem Markovian queueing network with customers arrival rate of $\lambda = 2$/minute and service rates $\mu_1 = 4$/minute at station-1 and $\mu_2 = 6$/minute at station-2. Compute the waiting time of a customer in the system and the probability that both the servers are idle.

PART B — ($5 \times 16 = 80$ marks)

11. (a) (i) A bag contains 3 black and 4 white balls. Two balls are drawn at random one at a time without replacement. (1) What is the probability that the second ball drawn is white? (2) What is the conditional probability that the first ball drawn is white if the second ball is known to be white?

(ii) Suppose the random variable X has a geometric distribution $P(X = x) = \left(\frac{1}{3}\right)\left(\frac{2}{3}\right)^{x-1}$, $x = 1, 2, 3, \ldots$. Determine (1) $P(X \le 2)$ (2) $P(X > 4/X > 2)$ (3) Moment generating function, $M_X(t)$ of X and hence obtain $E(X)$ and $Var(X)$.

Or

(b) (i) A consulting firm rents cars from three rental agencies in the following manner: 20% from agency D, 20% from agency E and 60% from agency F. If 10% cars from D, 12% of the cars from E and 4% of the cars from F have bad tyres, what is the probability that the firm will get a car with bad tyres? Find the probability that a car with bad tyres is rented from agency F.

(ii) If a random variable X has the probability density function,

$$f(x) = \begin{cases} xe^{-x}, & x > 0 \\ 0, & x \le 0, \end{cases}$$

find (1) Moment generating function, $M_X(t)$ of X and hence obtain $E(X)$ and $Var(X)$ (2) Cumulative distribution function of X (3) $P(X \le 2)$.

12. (a) (i) Let the joint probability mass function of the random variables (X, Y) be

$$P(X = x, Y = y) = \begin{cases} \frac{x+y}{12}, & x = 1,2,\ y = 1, 2 \\ 0, & \text{otherwise.} \end{cases}$$

Find (1) the marginal probability mass functions of X and Y (2) $P(X + Y \le 3)$ (3) $P(X > Y)$ (4) Are the R.Vs X and Y independent?

(ii) The joint probability density function of (X, Y) is

$$f(x, y) = \begin{cases} Cxy^2, & 0 \le x \le y \le 1 \\ 0, & \text{otherwise.} \end{cases}$$

Determine (1) the value of 'C' (2) the p.d.f. conditional of X given that $Y = y$ (3) $E(XY)$.

Or

(b) (i) Let X and Y be discrete R.Vs with joint probability mass function

$$P(X = x, Y = y) = \begin{cases} \dfrac{x+y}{21}, & x = 1, 2, 3, \ y = 1, 2 \\ 0, & \text{otherwise.} \end{cases}$$

Compute the correlation coefficient, ρ_{XY}, of X and Y.

(ii) Two random variables X and Y have joint p.d.f.

$$f(x, y) = \begin{cases} e^{-(x+y)}, & x > 0, y > 0 \\ 0, & \text{otherwise.} \end{cases}$$

Find the p.d.f. of the R.V. $U = \dfrac{X}{Y}$.

13. (a) (i) A random process is given as $X(t) = U + V\cos(\omega t + \theta)$ where U is a R.V. with $E(U) = 0$ and $Var(U) = 3$, V is a R.V. with $E(V) = 0$ and $Var(V) = 4$, 'ω' is a constant and 'θ' is a R.V. with p.d.f. $f(\theta) = \dfrac{1}{2\pi}$, $-\dfrac{\pi}{2} \le \theta \le \dfrac{3\pi}{2}$. It is further assumed that U, V and θ are independent R.Vs. Is the process $X(t)$ stationary in the wide-sense? Explain.

(ii) Let $\{X_n : n \ge 0\}$ be a Markov chain having state space $S = \{1, 2, 3\}$ and one-step TPM $P = \begin{bmatrix} \frac{3}{4} & \frac{1}{4} & 0 \\ \frac{1}{4} & \frac{1}{2} & \frac{1}{4} \\ 0 & \frac{3}{4} & \frac{1}{4} \end{bmatrix}$. (1) Draw a transition diagram for this chain. (2) Is the chain irreducible? Explain. (3) Is the state-3 ergodic? Explain.

Or

(b) (i) Let $X(t)$ and $Y(t)$ be two independent Poisson processes with parameters λ_1 and λ_2, respectively. Compute (1) $P(X(t)+Y(t)=n), n=0,1,2,\ldots$ (2) $P(X(t)-Y(t)=n), n=0,\pm1,\pm2,\ldots$

(ii) A random process has sample function of the form $X(t)=A\cos(\omega_0 t+\theta)$ where ω_0 is a constant. 'A' is a R.V. that has a magnitude of +1 and −1 with equal probability and 'θ' is a R.V. that is uniformly distributed over $[0, 2\pi]$. Assume that the random variables 'A' and 'θ' are independent. Is $X(t)$ a wide-sense stationary process? Explain.

14. (a) (i) Patients arrive at a clinic according to a Poisson process at a rate of 30 patient per hour. The waiting room cannot accommodate more than 14 patients. Examination time per patient is exponentially distributed random variable with rate of 20 per hour. (1) Find the effective arrival rate at the clinic. (2) What is the probability that an arriving patient will not wait? (3) What is the expected waiting time until a patient is discharged from the clinic?

(ii) For an $M/M/1/\infty:FCFS$ queueing system, derive the system of differential-difference equations for the system size probabilities. Obtain the corresponding steady-state equations and hence calculate the steady-state probabilities of the system size and its the mean system size.

Or

(b) (i) A petrol pump station has 4 pumps. The service time follows an exponential distribution with mean of 6 minutes and cars arrive for service in a Poisson process at the rate of 30 cars per hour. Compute (1) the probability that an arriving car will have to wait in the system (2) the average waiting time W_q in the queue (3) the mean number, L_s, of cars in the system.

(ii) For an $M/M/1$ balking queue, derive the steady-state probabilities of the system size by assuming that the service rate as $\mu_n=\mu$, $n=1,2,3,\ldots$ and the arrival rate of the customers as $\lambda_n=\dfrac{\lambda}{n+1}$, $n=0,1,2,\ldots$ where 'n' is the number of customers in the system.

15. (a) Discuss an $M/G/1/\infty:FCFS$ queueing system and hence obtain the Pollaczek-Khintchine (P-K) mean value formula. Deduce also the mean number of customers for the $M/M/1/\infty:FCFS$ queueing system from the P-K mean value formula.

Or

(b) Discuss the Jackson open queueing network system and hence obtain the corresponding product form solution of the system size probabilities.

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Reg. No. : | | | | | | | | | | | | |

Question Paper Code : 50789

B.E./B.Tech. DEGREE EXAMINATION, NOVEMBER/DECEMBER 2017

Fifth Semester

Computer Science and Engineering

MA 6566 – DISCRETE MATHEMATICS

(Regulations 2013)

e : Three Hours | Maximum : 100 Marks

Answer ALL questions

PART – A **(10×2=20 Marks)**

Find the truth value of $\forall x(x^2 \geq x)$ if the universe of discourse consists of all real numbers. Also write the negation of the given statement.

If the universe of discourse consists of all real numbers then translate the following formula into a logical statement :

$\forall x \exists y \forall z \left[(x > 0) \rightarrow [y^2 = x = (-y)^2]\right] \wedge \left[(z^2 = x) \rightarrow (z = y \vee -y)\right]$

How many cards must be selected from a standard deck of 52 cards (4 different suits of equal size) to guarantee that at least three cards of the same suit are chosen ?

Write the particular solution of the recurrence relation $a_n = 6a_{n-1} - 9a_{n-2} + 3^n$.

Draw a graph that is an Euler graph but not Hamiltonian.

Can you draw a graph of 5 vertices with degree sequence 1, 2, 3, 4, 5 ?

Define 'kernel of homomorphism' in a group.

If $\langle R, +, . \rangle$ is a ring then prove that a. $0 = 0, \forall a \in R$ and 0 is the identity element in R under addition.

State modular inequality of lattices.

Write the only Boolean algebra whose Hasse diagram is a chain.

PART – B (5×16=80 Marks)

11. a) i) Show that the following two statements are logically equivalent : "It is not true that all comedians are funny" and "There are some comedians who are not funny". (8)

ii) Prove that the conditional statement $[(P \rightarrow Q) \wedge (Q \rightarrow R)] \rightarrow (P \rightarrow R)$ is a tautology using logical equivalences. (8)

(OR)

b) i) Use rules of inference to prove that the premises "A student in this class has not read the book" and "Everyone in this class passed the first exam" imply the conclusion "Someone who passe the first exam has not read the book". (8)

ii) In an island there are two kind of inhabitants Knights (who always tell the truth) and their opposites, Knaves (who always lie). Let A and B be any two people from that island. A says "B is a knight" and B says "The two of us are opposite types". Define exhaustive proof strategy and use it to find the nature of A and B. (8)

12. a) A valid code word is an n-digit decimal number containing even number of 0's. If a_n denotes the number of valid code words of length n then find an explicit formula for a_n using generating functions. (16)

(OR)

b) i) If H_n denote harmonic numbers, then prove that $H_2n \geq 1+\frac{n}{2}$ using mathematical induction. (10)

ii) A total of 1232 students have taken a course in Spanish, 879 have taken a course in French and 114 have taken a course in Russian. Further, 103 have taken courses in both Spanish and French, 23 have taken courses in both Spanish and Russian and 14 have taken courses in both French and Russian. If 2092 students have taken at least one of Spanish, French and Russian, how many students have taken a course in all three languages ? (6)

13. a) i) Examine whether the following two graphs G and G′ associated with the following adjacency matrices are isomorphic.

$$\begin{matrix} 0&1&0&1&0&0 \\ 1&0&1&0&0&1 \\ 0&1&0&1&0&0 \\ 1&0&1&0&1&0 \\ 0&0&0&1&0&1 \\ 0&1&0&0&1&0 \end{matrix} \quad \text{and} \quad \begin{matrix} 0&1&0&0&1&0 \\ 1&0&1&0&0&0 \\ 0&1&0&1&0&1 \\ 0&0&1&0&1&0 \\ 1&0&0&1&0&1 \\ 0&0&1&0&1&0 \end{matrix}$$ (10)

ii) Discuss the various graph invariants preserved by isomorphic graphs. (6)

(OR)

i) Prove that a simple graph with n vertices and k components can not have more than $\frac{(n-k)(n-k+1)}{2}$ edges. (10)

i) Prove that a simple graph is bipartite if and only if it is possible to assign one of two different colors to each vertex of the graph so that no two adjacent vertices are assigned the same color. (6)

If G is a group of order n and H is a sub-group of G of order m, then prove the following results :

i) $a \in G$ is any element, then the left coset aH of H in G consists of as many elements as in H. (4)

ii) Any two left cosets of H in G is either equal or disjoint. (8)

ii) The index of H in G is an integer. (4)

(OR)

i) Examine whether $G = \left\{ \begin{pmatrix} a & a \\ a & a \end{pmatrix} : a \neq 0 \in R \right\}$ is a commutative group under matrix multiplication, where R is the set of all real numbers. (10)

ii) Prove that (Z_5, X_5) is a commutative monoid, where X_5 is the multiplication modulo 5. (6)

i) Let $\langle L, \leq \rangle$ be a lattice in which * and $\oplus$ denote the operations of meet and join respectively. For any $a, b \in L$, $a \leq b \Leftrightarrow a * b = a \Leftrightarrow a \oplus b = b$. (8)

ii) Prove that every chain is a distributive lattice. (8)

(OR)

i) In a Boolean algebra B, if a, b, $c \in B$, then prove that $a \leq b \Leftrightarrow a * b' = 0 \Leftrightarrow a' \oplus b = 1 \Leftrightarrow b' \leq a'$. (12)

ii) Let $\langle L, *, \oplus \rangle$ and $\langle S, \wedge, \vee \rangle$ be any two lattices with the partial orderings $\leq$ and $\leq'$ respectively. If g is a lattice homomorphism, then g preserves the partial ordering. (4)

Reg. No. : | | | | | | | | | | | | |

Question Paper Code : 20758

B.E./B.Tech. DEGREE EXAMINATION, NOVEMBER/DECEMBER 2018.

Fifth Semester

Computer Science and Engineering

MA 6566 — DISCRETE MATHEMATICS

(Regulations 2013)

Time : Three hours Maximum : 100 marks

Answer ALL questions.

PART A — ($10 \times 2 = 20$ marks)

1. Write the contra positive of the implication. "If it is Sunday then it is holiday".

2. Show that the propositions $p \to q$ and $\neg p \vee q$ are equivalent.

3. How many cards must be selected from a deck of 52 cards to guarantee that at least three cards of the same suit are chosen?

4. How many bit strings of length 12 contain exactly four 1s?

5. Show that the number of odd degree vertices in a simple graph is even.

6. Give an example of a graph which is both Eulerian and Hamiltonian.

7. Define a semigroup and give an example.

8. Show that in a group $(G,*)$ if for any $a,b \in G$, $(a*b)^2 = a^2 * b^2$, then $(G,*)$ is abelian.

9. Draw the Hasse diagram of $(S_{24}, /)$ where S_{24} denotes the set of positive divisors of 24 and / denotes the relation "division".

10. Prove that in a lattice $(L, \leq)$, $a*(a \oplus b) = a$ where $*$ and $\oplus$ denote the meet and join.

PART B — (5 × 16 = 80 marks)

11. (a) (i) Translate the statement $\forall x(C(x) \vee \exists y(C(y) \wedge F(x,y)))$ into English, where $C(x)$ is "x has a computer", $F(x,y)$ is "x and y are friends" and the universe of discourse for both x and y consists of all students in your class. (4)

(ii) Translate the statement "The sum of two positive integers is a positive integer" into a logical expression. (4)

(iii) Show that the premises, "A student in this class has not read the book" and "Everyone in this class passed the exam" imply the conclusion "Someone who passed the exam has not read the book". (8)

Or

(b) (i) Obtain the principal disjunctive and conjunctive normal forms of the formula $(\sim p \rightarrow r) \wedge (q \leftrightarrow p)$. (8)

(ii) Using proof by contradiction, prove that $\sqrt{2}$ is irrational. (8)

12. (a) (i) Use mathematical induction to show that $n^2 - 1$ is divisible by 8 whenever n is an odd positive integer. (8)

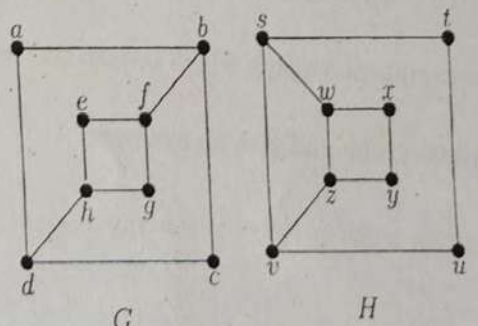
(ii) Solve the recurrence relation $f_n = f_{n-1} + f_{n-2}$ with $f_0 = 0$; $f_1 = 1$. (8)

Or

(b) (i) Using generating functions, solve $a_n = 8a_{n-1} + 10^{n-1}$ with $a_0 = 1; a_1 = 9$. (8)

(ii) How many onto functions are there from a set with six elements to set with three elements? (8)

13. (a) (i) Determine whether the graphs given below are isomorphic. (8)



(ii) Let G be a simple graph with adjacency matrix A. Show that the number of different walks of length r from v_i to v_j, where r is a positive integer, equals the $(i,j)^{th}$ entry of A^r. (8)

Or

(b) (i) Show that a connected simple graph is Eulerian if and only if all its vertices have even degree. (8)

(ii) Represent each of the following graphs with an adjacency matrix.

(1) K_4

(2) $K_{1,4}$

(3) C_4

(4) W_4. (8)

14. (a) (i) State and prove Lagrange's theorem on groups. (12)

(ii) Show that if every element in a group is its own inverse, then the group must be abelian. (4)

Or

(b) (i) Show that a subset $S \neq \phi$ of G is a subgroup of the group $(G,*)$ if and only if for any pair of elements $a, b \in S, a * b^{-1} \in S$. (8)

(ii) Let f be a group homomorphism from $(G,*)$ to (H,Δ). Define Kernel of f and show that it is a subgroup of $(G,*)$. (8)

15. (a) (i) Show that every chain is a distributive lattice. (8)

(ii) Show that every distributive lattice is modular, but not conversely. (8)

Or

(b) (i) Show that the following are equivalent in a Boolean Algebra

$a \leq b \Leftrightarrow a * b' = 0 \Leftrightarrow b' \leq a' \Leftrightarrow a' \oplus b = 1$. (8)

(ii) In a Boolean algebra, prove that $(a * b)' = a' \oplus b'$ and $(a \oplus b)' = a' * b'$. (8)

Reg. No. : | | | | | | | | | | | | |

Question Paper Code : 91790

B.E./B.Tech. DEGREE EXAMINATIONS, NOVEMBER/DECEMBER 2019

Fifth Semester

Computer Science and Engineering

MA 6566 – DISCRETE MATHEMATICS

(Regulations 2013)

Time : Three Hours | Maximum : 100 Marks

Answer ALL questions

PART – A (10×2=20 Marks)

1. Find the truth table for $p \rightarrow q$.
2. Express $A \leftrightarrow B$ in terms of the connectives $\{\wedge, \neg\}$.
3. State the pigeonhole principle.
4. Find the number of permutations of the letters in the word M I S S I S S I P P I ?
5. Draw the complete bipartite graph $K_{3,4}$.
6. State hand shaking theorem.
7. Show that every cyclic group is abelian.
8. Let Z be the group of integers with the binary operation $*$ defined by $a * b = a + b - 2$, for all $a, b \in Z$. Find the identity element of the group $\langle Z, * \rangle$.
9. Define a lattice.
10. State the De Morgan's laws of Boolean Algebra.

PART – B (5×16=80 Marks)

11. a) i) Prove that the premises $P \rightarrow Q$, $Q \rightarrow R$, $R \rightarrow S$, $S \rightarrow \sim R$ and $P \wedge S$ are inconsistent. (8)

ii) Show that the premises "one student in this class knows how to write programs in JAVA" and "Everyone who knows how to write programs in JAVA can get a high paying job" imply the conclusion "Someone in this class can get a high-paying job". (8)

(OR)

b) i) Without constructing the truth tables, obtain the principle disjunctive normal form of $(\sim P \rightarrow R) \wedge (Q \leftrightarrow P)$. (8)

ii) Show that $R \rightarrow S$ can be derived from the premises $P \rightarrow (Q \rightarrow S)$, $\sim R \vee P$ and Q. (8)

12. a) i) Prove that $\frac{1}{1.2}+\frac{1}{2.3}+\ldots+\frac{1}{n(n+1)}=\frac{n}{n+1}$ using principle of induction. (8)

ii) How many integers between 1 to 300 are there that are divisible by,

1) at least one of 3, 5, 7

2) 3 and 5 but not by 7

3) 5 but not 3 and 7. (8)

(OR)

b) i) A box contains six white balls and five red balls. Find the number of ways four balls can be drawn from the box if

1) They can be of any colour

2) Two must be white and two red

3) They must all be of the same color. (8)

ii) Solve $D(k) - 7D(k-2) + 6D(k-3)=0$, where $D(0) = 8$, $D(1) = 6$ and $D(2)= 22$. (8)

13. a) i) If G is a connected simple graph with n vertices with $n \geq 3$, such that the degree of every vertex in G is at least $\frac{n}{2}$, then prove that G has Hamilton cycle. (10)

ii) If G is self complementary graph, then prove that G has $n \equiv 0$ (or) $1 \pmod 4$ vertices. (6)

(OR)

b) i) Define isomorphism between two graphs. Are the simple graphs with the following adjacency matrices isomorphic ? (10)

$$\begin{bmatrix} 0 & 1 & 0 & 0 & 0 & 1 \\ 1 & 0 & 1 & 0 & 1 & 0 \\ 0 & 1 & 0 & 1 & 0 & 1 \\ 0 & 0 & 1 & 0 & 1 & 0 \\ 0 & 1 & 0 & 1 & 0 & 1 \\ 1 & 0 & 1 & 0 & 1 & 0 \end{bmatrix} \begin{bmatrix} 0 & 1 & 0 & 0 & 0 & 1 \\ 1 & 0 & 1 & 0 & 0 & 1 \\ 0 & 1 & 0 & 1 & 1 & 0 \\ 0 & 0 & 1 & 0 & 1 & 0 \\ 0 & 0 & 1 & 1 & 0 & 1 \\ 1 & 1 & 0 & 0 & 1 & 0 \end{bmatrix}$$

ii) Prove that the number of odd degree vertices in any graph is even. (6)

14. a) State and prove Lagrange's theorem on groups. (16)

(OR)

b) i) Prove that every subgroup of a cyclic group is cyclic. (8)

ii) Let $f : G \to H$ be a homomorphism from the group $\langle G, * \rangle$ to the group $\langle H, \Delta \rangle$. Prove that the kernel of f is a normal subgroup of G. (8)

15. a) i) In a complemented and distributive lattice, prove that complement of each element is unique. (8)

ii) Prove that every chain is a distributive lattice. (8)

(OR)

b) i) Consider the Lattice D_{105} with the partial ordered relation, "divides" then

1) Draw the Hasse diagram of D_{105}.
2) Find the complement of each elements of D_{105}.
3) Find the set of atoms of D_{105}.
4) Find the number of subalgebras of D_{105}. (8)

ii) Show that in a Boolean algebra

$a \leq b \Leftrightarrow a \wedge \bar{b} = 0 \Leftrightarrow \bar{a} \vee b = 1 \Leftrightarrow \bar{b} \leq \bar{a}$. (8)

Reg. No. : | | | | | | | | | | | | |

Question Paper Code : 72078

B.E./B.Tech. DEGREE EXAMINATION, APRIL/MAY 2017.

Fifth Semester

Computer Science and Engineering

MA 6566 — DISCRETE MATHEMATICS

(Regulations 2013)

Time : Three hours Maximum : 100 marks

Answer ALL questions.

PART A — ($10 \times 2 = 20$ marks)

1. Find the truth table for $p \to q$.

2. Express $A \leftrightarrow B$ in terms of the connectives $\{\wedge, \neg\}$.

3. How many different words are there in the word MATHEMATICS?

4. Find the minimum number of students need to guarantee that five of them belongs to the same subject, if there are five different major subjects.

5. How many edges are there in a graph with 10 vertices each of degree 3?

6. Give an example of self complementary graph.

7. Show that every cyclic group is abelian.

8. Let Z be the group of integers with the binary operation $*$ defined by $a * b = a + b - 2$, for all $a, b \in Z$. Find the identity element of the group $\langle Z, * \rangle$.

9. Let X = {1, 2, 3, 4, 5, 6} and R be a relation defined as $\langle x, y \rangle \in R$ if and only if $x - y$ is divisible by 3. Find the elements of the relation R.

10. Show that the absorption laws are valid in a Boolean algebra.

PART B — (5 × 16 = 80 marks)

11. (a) (i) Obtain the principal conjunctive normal form and principal disjunctive normal form of $(\neg P \to R) \wedge (Q \leftrightarrow P)$ by using equivalences. (8)

(ii) Use rules of inferences to obtain the conclusion of the following arguments :

"Babu is a student in this class, knows how to write programmes in JAVA". "Everyone who knows how to write programmes in JAVA can get a high-paying job". Therefore, "someone in this class can get a high-paying job". (8)

Or

(b) (i) Show that $((P \vee Q) \wedge \neg(\neg P \wedge (\neg Q \vee \neg R))) \vee (\neg P \wedge \neg Q) \vee (\neg P \wedge \neg R)$ is a tautology by using equivalences. (8)

(ii) Show that $R \to S$ is logically derived from the premises $P \to (Q \to S)$, $\neg R \vee P$ and Q. (8)

12. (a) (i) Find the number of integers between 1 and 500 that are not divisible by any of the integers 2,3, 5 and 7. (8)

(ii) Solve the recurrence relation $a_n - 7a_{n-1} + 6a_{n-2} = 0$, for $n \geq 2$ with initial conditions $a_0 = 8$ and $a_1 = 6$, using generating function. (8)

Or

(b) (i) Using mathematical induction, show that $\sum_{r=0}^{n} 3^r = \frac{3^{n+1} - 1}{2}$. (8)

(ii) There are six men and five women in a room. Find the number of ways four persons can be drawn from the room if (1) they can be male or female, (2) two must be men and two women, (3) they must all are of the same sex. (8)

13. (a) (i) If G is a connected simple graph with n vertices with $n \geq 3$, such that the degree of every vertex in G is at least $\frac{n}{2}$, then prove that G has Hamilton cycle. (10)

(ii) Prove that the complement of a disconnected graph is connected. (6)

Or

(b) (i) Define isomorphism between two graphs. Are the simple graphs with the following adjacency matrices isomorphic? (10)

$$\begin{bmatrix} 0 & 1 & 0 & 0 & 0 & 1 \\ 1 & 0 & 1 & 0 & 1 & 0 \\ 0 & 1 & 0 & 1 & 0 & 1 \\ 0 & 0 & 1 & 0 & 1 & 0 \\ 0 & 1 & 0 & 1 & 0 & 1 \\ 1 & 0 & 1 & 0 & 1 & 0 \end{bmatrix} \quad \begin{bmatrix} 0 & 1 & 0 & 0 & 0 & 1 \\ 1 & 0 & 1 & 0 & 0 & 1 \\ 0 & 1 & 0 & 1 & 1 & 0 \\ 0 & 0 & 1 & 0 & 1 & 0 \\ 0 & 0 & 1 & 1 & 0 & 1 \\ 1 & 1 & 0 & 0 & 1 & 0 \end{bmatrix}$$

(ii) Prove that the number of odd degree vertices in any graph is even. (6)

14. (a) State and prove Lagrange's theorem on groups. (16)

Or

(b) (i) Prove that every subgroup of a cyclic group is cyclic. (8)

(ii) Let $f : G \to H$ be a homomorphism from the group $\langle G, * \rangle$ to the group $\langle H, \Delta \rangle$. Prove that the kernel of f is a normal subgroup of G. (8)

15. (a) (i) Show that every chain is a distributive lattice. (8)

(ii) In a distributive complemented lattice, show that the following are equivalent. (8)

(1) $a \leq b$

(2) $a \wedge \overline{b} = 0$

(3) $\overline{a} \vee b = 1$

(4) $\overline{b} \leq \overline{a}$.

Or

(b) Show that every ordered lattice $\langle L, \leq \rangle$ satisfies the following properties of the algebraic lattice (i) idempotent (ii) commutative (iii) Associative (iv) Absorption. (16)

Reg. No. : | | | | | | | | | | | | |

Question Paper Code : 41320

B.E./B.Tech. DEGREE EXAMINATION, APRIL/MAY 2018

Fifth Semester

Computer Science and Engineering

MA 6566 – DISCRETE MATHEMATICS

(Regulations 2013)

Time : Three Hours | Maximum : 100 Marks

Answer ALL questions

PART – A (10×2=20 Marks)

1. Define proposition.
2. Give the symbolic form of "Some men are giant".
3. Define Pigeon hole principle.
4. How many permutations can be made out of letter or word 'COMPUTER' ?
5. Show that there does not exist a graph with 5 vertices with degrees 1, 3, 4, 2, 3 respectively.
6. Define Hamiltonian path.
7. Define semi group.
8. Prove that in a group idempotent law is true only for identity element.
9. Let A = {1, 2, 5, 10} with the relation divides. Draw the Hasse diagram.
10. Prove that a lattice with five elements is not a Boolean algebra.

PART – B (5×16=80 Marks)

11. a) i) Show that $(7P \wedge (7Q \wedge R) \vee (Q \wedge R) \vee (P \wedge R) \Leftrightarrow R$, without using truth table. (8)

ii) Show that using Rule C.P, $7P \vee Q, 7Q \vee R, R \rightarrow S \Rightarrow P \rightarrow S$ (8)

(OR)

b) i) Find the PCNF of $(P \vee R) \wedge (P \vee 7Q)$ Also find its PDNF, without using truth table. (8)

ii) Show that $(\forall x)\,[P(x) \vee Q(x)] \Rightarrow (\forall x)\,P(x) \vee (\exists x)\,Q(x)$. (8)

12. a) i) Prove that $n^3 - n$ is divisible by 3 for $n \geq 1$ (8)

ii) Solve $G(k) - 7G(k-1) + 10G(k-2) = 8k + 6$. (8)

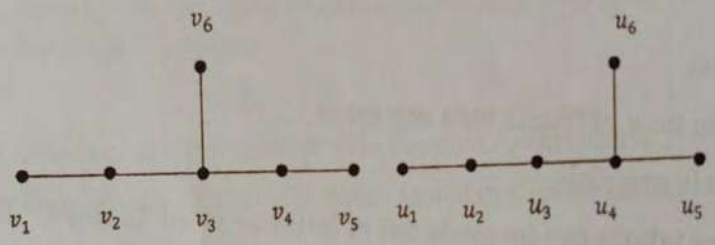
(OR)

b) i) Find the numbers between 1 to 250 that are not divisible by any of the integers 2 or 3 or 5 or 7. (8)

ii) Solve using generating functions : $S(n) + 3S(n-1) - 4S(n-2) = 0; n \geq 2$ given $S(0) = 3, S(1) = -2$. (8)

13. a) i) State and prove Hand shaking theorem. Hence prove that for any simple graph G with n vertices, the number of edges of G is less than or equal to $\frac{n(n-1)}{2}$. (8)

ii) Establish the isomorphism of the following pairs of graphs. (8)



(OR)

b) i) Prove that a graph G is disconnected if and only if its vertex set V can be partitioned into two non-empty, disjoint subsets V_1 and V_2 such that there exists no edge in G whose one end vertex is in subset V_1 and the other in subset V_2. (8)

ii) Prove that a connected graph G is an Euler graph if and only if all vertices of G are of even degree. (8)

14. a) i) Show that $(Q^+, *)$ is an abelian group, where * is defined by

$$a * b = \frac{ab}{2}, \forall a, b \in Q^+$$ (8)

ii) Prove that kernel of a homomorphism is a normal subgroup of G. (8)

(OR)

b) i) Prove that intersection of two normal subgroups of a group G is again a normal subgroup of G. (8)

ii) Let G be a finite group and H be a subgroup of G. Then prove that order of H divides order of G. (8)

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15. a) i) Show that $(N, \leq)$ is a partially ordered set, where N is the set of all positive integers and $\leq$ is a relation defined by $m \leq n$ if and only if $n - m$ is a non-negative integer. (8)

ii) In a complemented and distributive lattice, prove that complement of each element is unique. (8)

(OR)

b) i) Let $D_{30} = \{1, 2, 3, 5, 6, 10, 15, 30\}$ with a relation $x \leq y$ if and only if x divides y. Find :

i) All lower bounds of 10 and 15

ii) GLB of 10 and 15

iii) All upper bound are 10 and 15

iv) LUB of 10 and 15

v) Draw the Hasse diagram for D_{30}. (8)

ii) Let $(L, , \vee, \wedge, \leq)$ be a distributive lattice and $a, b, \in L$ if $a \wedge b = a \wedge c$ and $a \vee b = a \vee c$. Then show that $b = c$. (8)

PART – B

(5×13=65 Marks)

11. a) i) Categorize the application areas of distributed systems. (7)

ii) Summarize the recent trends in distributed systems. (6)

(OR)

b) Consider a distributed system environment of the prevailing WWW and discuss the challenges meeting out sharing of resources. (13)

12. a) Compare the various types of system models in distributed environment. (13)

(OR)

b) i) List and explain the parts of a distributed object model. (7)

ii) Give a note on characteristics of group communication. (6)

13. a) i) Give the functional and non-functional requirements of peer-to peer middleware. (7)

ii) Specify the benefits of overlays routing over traditional multitoning and intelligent routing. (6)

(OR)

b) i) Explain the function of File Service Architecture. (7)

ii) Briefly describe about name space implementation. (6)

14. a) i) Generate Chandy and Lamport's snapshot algorithm for determining global states of distributed systems. (7)

ii) Outline the importance of nested transactions with an example. (6)

(OR)

b) i) Why do we go for optimistic concurrency control ? Explain. (7)

ii) Briefly explain the operation of two-phase commit protocol. (6)

15. a) Discuss the implementation of process migration with an example. (13)

(OR)

b) Tabulate the comparison of various load-balancing approaches used in distributed environment. (13)

PART – C

(1×15=15 Marks)

16. a) Explain the Pastry's routing algorithm. Illustrate with an example. (15)

(OR)

b) With a simple case study, explain the concept of distributed deadlocks. (15)

Reg. No. : | | | | | | | | | | | | |

Question Paper Code : 50394

B.E./B.Tech. DEGREE EXAMINATION, NOVEMBER/DECEMBER 2017

Fifth Semester

Computer Science and Engineering

CS 6504 : COMPUTER GRAPHICS

(Regulations 2013)

ıe : Three Hours | Maximum : 100 Marks

Answer ALL questions

PART – A **(10×2=20 Marks)**

List out any four input devices that are used in graphics field.

Give the initial decision parameter equation for Bresenham's line drawing algorithm.

What do you mean by shearing ?

Define Clipping.

What is a Quadric surface ?

Differentiate parallel projection from perspective projection.

How you define intensity ?

State Dithering technique.

Define animation.

Give different classification of fractals.

PART – B **(5×13=65 Marks)**

a) Explain the working of DDA line drawing algorithm with the procedure and with an example.

(OR)

b) Describe the functionalities of Refresh Cathode Ray Tube with suitable diagram.

12. a) i) Discuss the working of 2D Scaling with respect to origin and with respect to fixed (pivot) point with suitable example.

ii) Prove that two successive translations are additive.

(OR)

b) Describe how to clip the given lines using Cohen – Sutherland line clipping algorithm. Explain the above with suitable example and equations.

13. a) Determine the blending functions for cubic (i.e. n = 3) Bezier Curve and also list out the properties of the Bezier Curve.

(OR)

b) Demonstrate any three types of 3D rotation with equations and with sample diagrams.

14. a) Illustrate the following illumination models with suitable diagram : Ambient Light and Diffuse Reflection.

(OR)

b) Discuss the following color models with suitable diagram and equations : RGB, HSV and YIQ models.

15. a) Explain how to create a morphing effect in computer animation with suitable equations and with an example.

(OR)

b) Explain the purpose and working of ray tracing method with suitable diagram and also explain about ray surface intersection calculations.

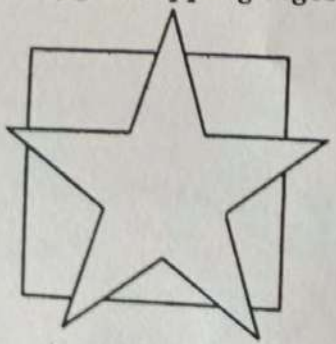
PART – C

(1×15=15 Marks)

16. a) Write midpoint circle algorithm and apply that algorithm to find the pixel values of the circle whose radius r = 4 and centre of the circle = (0, 0).

(OR)

b) Demonstrate how to clip the following polygon using Sutherland – Hodgeman Polygon clipping algorithm ?



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Question Paper Code : 20370

B.E./B.Tech. DEGREE EXAMINATION, NOVEMBER/DECEMBER 2018.

Fifth Semester

Computer Science and Engineering

CS 6504 — COMPUTER GRAPHICS

(Regulations 2013)

(Common to PTCS 6504 – Computer Graphics for B.E. (Part-Time) Fifth Semester – Computer Science and Engineering – Regulations 2014)

Time : Three hours

Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. What is DVST? Give its importance.

2. Mention the two basic approaches to area filling on raster systems.

3. What is the need of homogeneous coordinates?

4. What are the types of clipping?

5. Define blobby object.

6. Differentiate between parallel and perspective projections.

7. What is meant by illumination?

8. What is HSV color model?

9. What is Morphing?

10. Mention the characteristics of a fractal object.

PART B — (5 × 13 = 65 marks)

11. (a) With suitable diagram, describe the architecture of a raster-graphics system with a display processor. (13)

Or

(b) Explain the Bresenham's line drawing algorithm with suitable example. (13)

12. (a) Discuss the various two dimensional basic transformations with suitable figures. (13)

Or

(b) Explain the Weiler-Atherton Polygon Clipping. (13)

13. (a) Describe the quadratic surfaces in detail. (13)

Or

(b) Explain the depth-buffer method of detecting the visible surfaces. (13)

14. (a) (i) Discuss about the XYZ color model. (6)

(ii) Write a note on CIE chromaticity diagram. (7)

Or

(b) Write a note on : (6)

(i) RGB color model (7)

(ii) CMY color model.

15. (a) Explain the steps involved in the design of animation sequence. (13)

Or

(b) Briefly describe the following : (6)

(i) Ray Tracing (7)

(ii) Koch curve

PART C — (1 × 15 = 15 marks)

16. (a) Use the Cohen Sutherland algorithm to clip line P1(70, 20) and P2(100, 10) against a window lower left hand corner (50, 10) and upper right hand corner (80, 40). (15)

Or

(b) Suppose we have a B-spline curve of degree 3 with a knot vector as follows : (15)

u0 to u3	u4	u5	u6	u7	u8 to u11
0	0.2	0.4	0.6	0.8	1

Insert a new knot t = 0.5, find new control points and new knot vector.

20370

Reg. No. : | | | | | | | | | | | | |

Question Paper Code : 71685

B.E./B.Tech. DEGREE EXAMINATION, APRIL/MAY 2017.

Fifth Semester

Computer Science and Engineering

CS 6504 — COMPUTER GRAPHICS

(Regulations 2013)

Time : Three hours Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. Define the term resolution
2. How to compute the address of a location in frame buffer?
3. Compare interior and exterior clipping.
4. Define viewport.
5. List out the various representation schemes used in three dimensional objects.
6. What is projection? List out the types of projection?
7. Write any two Drawbacks of Phong Shading?
8. State the use of chromaticity diagram.
9. Define morphing.
10. What is fractal?

PART B — (5 × 16 = 80 marks)

11. (a) Explain the steps in mid point circle drawing algorithm with an example. (16)

Or

(b) Explain on the following:

(i) Direct View Storage Tubes (6)

(ii) Flat Panel Displays (6)

(iii) Liquid Crystal Displays. (4)

12. (a) (i) Explain in detail on any two basic two dimensional geometric transformations. (8)

(ii) Rotate the point P (2, –4) about the origin 30° in anti-clockwise direction. (8)

Or

(b) (i) Derive the matrix representation of composite transformation. (8)

(ii) What are the stages involved in 2D viewing transformation pipeline? Explain briefly about each stage. (8)

13. (a) (i) Determine the 3D transformation matrices to scale a line PQ in the x direction by 3 by keeping point P fixed. The rotate this line by 45°. anticlockwise about the Z axis. Give P (1, 5, 2) and Q (4, 5, 6, 3). (8)

(ii) Explain the different 3D object representations in detail. (8)

Or

(b) (i) Find the points on the Bezier curve which has starting and ending points $P_0(2, 3)$ and $P_3(4, -3)$ and is controlled by $P_1(5, 6)$ and $P_2(7, 1)$ for $u = 0.9$. (8)

(ii) Show that the Bezies curve always touches the starting point (for $u = 0$) and the ending point (for $u = 1$). (8)

14. (a) Briefly explain different color models in detail. (16)

Or

(b) (i) Explain in detail about the properties of light and draw chromaticity diagram. (8)

(ii) Write notes on halftone patterns and dithering techniques. (8)

15. (a) (i) Discuss on the Grammar-based models in detail. (8)

(ii) Give a detailed note on the ways in which motion of objects can be specified in an animation system. (8)

Or

(b) (i) Explain ray tracing method in detail. (8)

(ii) What is Morphing? Explain in detail about morphing with an example. (8)

Reg. No. : | | | | | | | | | | | | |

Question Paper Code : 40912

B.E./B.Tech. DEGREE EXAMINATION, APRIL/MAY 2018

Fifth Semester

Computer Science and Engineering

CS 6504 – COMPUTER GRAPHICS

(Regulations 2013)

Time : Three Hours | Maximum : 100 Marks

Answer ALL questions

PART – A (10×2=20 Marks)

1. Differentiate raster scan system with random scan systems.
2. Mention the approaches used to fill an area on raster systems.
3. Write the equation for 2D rotation with respect to pivot point.
4. What is meant by window-to-viewport transformation ?
5. What are blobby objects ?
6. How a parallel projection differs from perspective projection ?
7. Give the properties of light.
8. What is HSV colour model ? Draw the HSV hexcone.
9. What is the role of storyboard in designing an animation ?
10. What is meant by ray tracing ?

PART – B (5×13=65 Marks)

11. a) Explain the working of following input devices :
    i) Trackball and spaceball. (4)
    ii) Lightpens. (3)
    iii) Joysticks. (3)
    iv) Image scanners. (3)

(OR)

b) Apply the DDA line drawing algorithm to find the intermediate pixel values for the following lines :

Line : 1 : A(15, 20) B(13, 18) Line 2 : C(2, 40) D(32, 35) Line 3 : E(10, 10) F(16, 30). (13)

12. a) Explain the types of 2D reflection along with their transformation matrices. (13)

(OR)

b) Illustrate the working of Cohen Sutherland line clipping algorithm and apply the algorithm to clip the following lines P1P2 and P3P4 where P1 = (140, 45) P2 = (100, 60) P3 = (20, 50) P4 (60, 10) and the window size is given by (30, 40, 120, 90). (13)

13. a) Explain the following 3D object representations :
    i) Polygon Surfaces. (4)
    ii) Polygon Tables. (3)
    iii) Plane Equations. (3)
    iv) Polygon Meshes. (3)

(OR)

b) i) Write the transformation equations for different types of 3D rotation. (8)
    ii) Describe the logic of the Depth-buffer method to identify the visible surfaces on the 3D object. (5)

14. a) Explain in detail about halftone approximations and dithering techniques. (13)

(OR)

b) Write notes on the following colour models :
    i) YIQ colour model. (3)
    ii) CMY colour model. (3)
    iii) HLS colour model. (3)
    iv) RGB colour model. (4)

15. a) i) Discuss about the steps involved in designing an animation sequence. (6)

ii) What is called tweening ? Explain in detail about motion tweening with an example. (7)

(OR)

b) Write notes on the following : (6)

i) Koch curves. (7)

ii) Grammar based models.

PART – C (1×15=15 Marks)

16. a) Illustrate how to create a running tiger from moving auto mobile using "morphing effect" along with its pre processing steps. Also explain about its simulating accelerations. (15)

(OR)

b) Illustrate the design of a bicycle wheel by using appropriate graphics algorithms. (15)

Reg. No. : | | | | | | | | | | | | |

Question Paper Code : 52869

B.E./B.Tech. DEGREE EXAMINATIONS, APRIL/MAY 2019.

Fifth Semester

Computer Science and Engineering

CS 6504 — COMPUTER GRAPHICS

(Regulation 2013)

Time : Three hours Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. Define the term resolution.
2. How to compute the address of a location in frame buffer?
3. Mention the uses of translation and rotation with matrix representation.
4. Brief on window to viewpoint coordinate transformation.
5. What is a Quadric surface?
6. Differentiate parallel projection from perspective projection.
7. Define dithering. When does this occur?
8. Convert the given colour value to CMY colour mode where R = 0.23 G = 0.57. B = 0.11.
9. What is a scripting system ?
10. What is a turtle graphics program?

PART B — (5 × 13 = 65 marks)

11. (a) Explain the working of DDA line drawing algorithm with the procedure and with an example.

Or

(b) Describe the functionalities of Refresh Cathode Ray Tube with suitable diagram.

12. (a) Explain on the following 2D transformations.

(i) General Pivot point rotation

(ii) General Fixed Point Scaling

(iii) Perform 45 degree rotation of a triangle A(90, 0), B(1,1) and C(5, 3) about P(–1,1).

Or

(b) Explain in detail the Cohen-Sutherland line clipping algorithm with an example.

13. (a) (i) Discuss about 3Dimensional display methods.

(ii) Explain in detail about quadratic surfaces.

(iii) Brief on Polygon Meshes.

Or

(b) (i) Derive the 3D transformation matrix for rotation, scaling and translation about an arbitrary axis.

(ii) Write short notes about viewing coordinates.

(iii) Differentiate parallel projection and perspective projection in detail.

14. (a) Briefly explain different color models in detail.

Or

(b) (i) Explain in detail about the properties of light and draw chromaticity diagram.

(ii) Write notes on halftone patterns and dithering techniques.

15. (a) (i) Distinguish between raster animation and key frame animation in detail.

(ii) How will you generate grammar based model? Explain.

Or

(b) Write short notes on:

(i) Ray tracing

(ii) Koch curves

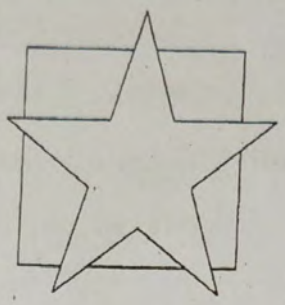
(iii) Morphing

PART C — (1 × 15 = 15 marks)

16. (a) Write midpoint circle algorithm and apply that algorithm to find the pixel values of the circle whose radius r = 4 and centre of the circle = (0, 0).

Or

(b) Demonstrate how to clip the following polygon using Sutherland — Hodgeman Polygon clipping algorithm?



Reg. No. :

Question Paper Code : 50391

B.E./B.Tech. DEGREE EXAMINATION, NOVEMBER/DECEMBER 2017

Fifth Semester

Computer Science and Engineering

CS 6501 – INTERNET PROGRAMMING

(Regulations 2013)

Time : Three Hours

Maximum : 100 Marks

Answer ALL questions.

PART – A (10×2=20 Marks)

1. Give the differences between abstract class and interface.
2. Define Applet.
3. What is web 2.0 ? Give example.
4. Why we use XHTML ?
5. Define JDBC.
6. What are Servlets ?
7. List out the advantages of PHP.
8. What is an XML parser ?
9. Define web service.
10. What is the use of XMLHttpRequest Object ?

PART – B (5×13=65 Marks)

11. a) How interface is declared and implemented in Java with example ? (13)

(OR)

b) How to create thread by using extending thread class ? Give an example. (13)

12. a) List and explain in detail the various HTML elements and also state the types of lists supported by HTML. (13)

(OR)

b) Explain the various types of Cascading Style Sheets with an example. (13)

13. a) i) Write a JavaScript to find factorial of a given number. (8)
ii) Differentiate GET and POST method. (5)

(OR)

b) i) Discuss about the servlet life cycle. (8)
ii) List some advantages of JSP. (5)

14. a) Explain how cookies are handled in PHP with example. (13)

(OR)

b) i) Explain about the XML Schema with example. (8)
ii) Write short notes on XSL. (5)

15. a) With a neat diagram, explain the AJAX client-server architecture. (13)

(OR)

b) Describe the general structure of SOAP message in detail. (13)

PART – C (1×15=15 Marks)

16. a) Write a Java applet program to display your name 10 times using different colors and fonts. (15)

(OR)

b) Design application to send an email using PHP. (15)

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Reg. No. : | | | | | | | | | | | | |

Question Paper Code : 20367

B.E./B.Tech. DEGREE EXAMINATION, NOVEMBER/DECEMBER 2018.

Fifth Semester

Computer Science and Engineering

CS 6501 — INTERNET PROGRAMMING

(Regulations 2013)

(Also Common to PTCS 6501 — Internet Programming for B.E. Part-Time – Fourth Semester – Computer Science and Engineering – Regulations 2014)

Time : Three hours | Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. List the properties of Threads.
2. Define transient and volatile Modifiers.
3. Differentiate between standalone and container tag.
4. Give an example for inline style sheet.
5. Mention the various Java Script Object models.
6. Name the differences between servlets and JSP.
7. List the important characteristics of PHP.
8. Explain DTD for XML Schemas.
9. Describe AJAX Control Extender Toolkit.
10. State the significance of a WSDL document.

PART B — (5 × 13 = 65 marks)

11. (a) (i) Write a Java Program to reverse a number. (6)

(ii) Write a Java Program to find the second smallest in the array of size 10. (7)

Or

(b) Discuss the concept of synchronization in thread and develop a JAVA code for reader/writer problem. (13)

12. (a) (i) Discuss the structure of the HTTP request message. (7)

(ii) Explain about the XHTML DTD with an Example. (6)

Or

(b) (i) Explain the significance of XHTML with the help of a real time application. Write necessary code snippets. (7)

(ii) Discuss the functionalities of Webserver and Webclient in detail. (6)

13. (a) (i) Explain any two validation functions in java script. (4)

(ii) Write a JavaScript Program to print Prime Numbers from 1 to 100. (9)

Or

(b) Explain in detail about Servlet Database Connectivity with an example of Student database. (13)

14. (a) (i) Design simple calculator using PHP. (6)

(ii) Explain about the control statements in PHP with example. (7)

Or

(b) Explain about DOM with the XML data processing. (13)

15. (a) (i) Explain the concept of JSON with an example. (6)

(ii) Describe SOAP, UDDI and WSDL in detail. (7)

Or

(b) Explain about the object that helps AJAX reload parts of a web page without reloading the whole page. (13)

PART C — ($1 \times 15 = 15$ marks)

16. (a) Design HTML forms by embedding JSP code for submission of a resume to a job portal website with appropriate database connectivity. (15)

Or

(b) Design a PHP application for College Management System with appropriate built-in functions and database. (15)

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Reg. No. : | | | | | | | | | | | | |

Question Paper Code : 91401

B.E./B.Tech. DEGREE EXAMINATIONS, NOVEMBER/DECEMBER 2019

Fifth Semester

Computer Science and Engineering

CS6501 – INTERNET PROGRAMMING

(Regulations 2013)

(Common to PTCS6501 – Internet Programming for B.E. (Part-Time) Fourth Semester – Computer Science and Engineering – Regulations 2014)

Time : Three Hours | Maximum : 100 Marks

Answer ALL questions

PART – A (10×2=20 Marks)

1. Give the syntax to create and initialize an array in Java. Write a Java program to find an element position in integer array.
2. State the ways in which string comparison can be implemented in Java.
3. What is meant by a web server ? Give two examples.
4. Mention any four advantages of CSS.
5. List any four methods of the Java Script Date object.
6. State four advantages of JSP over Java Servlets.
7. Why PHP is called a loosely typed language ?
8. Define XML namespace.
9. What is AJAX call back function ?
10. State the types of webservices.

PART – B (5×13=65 Marks)

11. a) i) Explain about exception handling in java with an example. (6)

ii) Explain about Java inner class with an example. (7)

(OR)

b) i) Explain about multithreading in Java. (7)

ii) List the four methods provided by the String Class for replacing found characters or substrings. (6)

12. a) i) Define Rich Internet Application. With a neat diagram show the components in the implementation of a rich internet application. (7)

ii) State the uses of HTML. Write an HTML code to create a table. (6)

(OR)

b) i) Mention the rules to be followed in writing a XHTML code. (6)

ii) Give an example of a CSS style rule. Write code to illustrate the use of embedded style sheet. (7)

13. a) i) Explain the role of document object model in enabling the creation of dynamic web pages using Javascript. (7)

ii) Write a java script to handle mouse events. (6)

(OR)

b) i) Explain the life cycle of a JSP page with a neat diagram. (7)

ii) List the types of JSTL tags and explain the JSTL SQL tags in detail. (6)

14. a) i) Write a PHP code to create an array and sort it using built in functions. (5)

ii) Write a PHP code to read from a cookie and display its contents. (8)

(OR)

b) i) Explain in detail the XML event oriented parsing technique. (6)

ii) Explain the process of XSL transformation and list the advantages of XSLT. (7)

15. a) i) List the steps involved in the AJAX operation and explain them in detail. (7)

ii) Explain the XMLHttpRequest object and its methods in detail. (6)

(OR)

b) State the components of a web service and explain the steps in the creation of a java web service in detail. (13)

PART – C

(1×15=15 Marks)

16. a) i) Write code to create a html page to get numeric input and e-mail ID from user. Validate the input using JSP code. (8)

ii) Explain implicit objects of JSP in detail. (7)

(OR)

b) Write a program to connect a servlet application with a database table and display the contents of the table. Provide functionalities of adding, deleting and searching the table with appropriate code segments. (15)

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Reg. No. : | | | | | | | | | | | | |

Question Paper Code : 71682

B.E./B.Tech. DEGREE EXAMINATION, APRIL/MAY 2017.

Fifth Semester

Computer Science and Engineering

CS 6501 – INTERNET PROGRAMMING

(Regulations 2013)

Time : Three hours Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. Write a Java program that displays the result of floating -point division.
2. Differentiate packages and interface.
3. List any two rich Internet applications
4. What is the difference between website and web server?
5. How exceptions are handled in Java script?
6. What are the three methods that is central to the lifecycle of a servlet?
7. How can a PHP program determine the type of browser that a web client is using?
8. List any two advantages of XML document.
9. What is the need of SOAP?
10. What do you mean by a web service?

PART B — (5 × 16 = 80 marks)

11. (a) Write a Java program that inputs three integers from the user and displays the sum, the largest number, the smallest number and determines whether the third number is a product of the first two numbers.

Or

(b) (i) Explain Java thread model with an example. (8)

(ii) What do you mean by an Applet? Create a Java program that repeatedly flashes image on the screen. (8)

12. (a) (i) Explain the enhanced features in HTML 5.0 with a neat example. (8)

(ii) Create an XHTML document that marks up your resume. (8)

Or

(b) (i) Write the CSS rule for controlling the positioning of elements in an XHTML document. (8)

(ii) Write a Javascript that calculates the product of the odd integers from 1 to 15 and then outputs the XHTML text that displays the result. (8)

13. (a) Write a program that allows the user to select a favourite programming language and post the choice to the server, The response is a web page in which the user can click a link to view a list of book recommendations. The cookies previously stored on the client are read by the servlet and form a web page containing the book recommendation. Use servlet, cookies and HTML.

Or

(b) Write a complete query application for books database using JDBC.

14. (a) (i) Write a PHP program that tests whether an e-mail address is input correctly. Verify that the input begins with a series of characters, followed by the @ character, another series of characters, a period '.' and a final series of characters. Test your program with both valid and invalid e-mail addresses. (8)

(ii) Create an XML document that marks up various sports and their descriptions. Use XSLT to tabulate neatly the elements and attributes of the document. (8)

Or

(b) (i) Discuss the merits and demerits of DOM and SAX parsers with neat examples. (8)

(ii) Write a JSP page that enables the user to input the first name and in response outputs the last name. (8)

15. (a) How to create, publish and test a web service. Explain with suitable examples using WSDL.

Or

(b) (i) Explain with illustrations, Ajax client server architecture. (6)

(ii) Create an XMLHttpRequest to retrieve data from an XML file and display the data in an HTML table. The data to be retrieved is a collection of stationary items stored in an XML file. (10)

Reg. No. : | | | | | | | | | | | | |

Question Paper Code : 71683

B.E./B.Tech. DEGREE EXAMINATION, APRIL/MAY 2017.

Fifth/Sixth Semester

Computer Science and Engineering

CS 6502 – OBJECT ORIENTED ANALYSIS AND DESIGN

(Common to Information Technology)

(Regulations 2013)

Time : Three hours Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. Define OOAD.
2. What are the perspectives to apply UML?
3. Differentiate cohesion and coupling.
4. Define modular design.
5. What is the relationship of a conceptual super class to a subclass?
6. What is the purpose of extends and include relationship in use case diagram?
7. What are the strengths and weakness of sequence and collaboration diagram.
8. Difference between logical architecture and layers.
9. Mention the steps involved in mapping design to code.
10. Explain about OO Integration Testing.

PART B — (5 × 16 = 80 marks)

11. (a) Explain about UML diagrams in detail with neat example. (16)

Or

(b) Explain in detail about Unified Process in OOAD? Explain the phases with neat diagram. (16)

12. (a) Explain the following GRASP patterns: Creator, Information Expert, Low Coupling, High Coupling and Controller. (16)

Or

(b) Explain in detail about the Factory Pattern and mention the Limitations and applications of Factory pattern. (16)

13. (a) Write briefly about elaboration and discuss the difference between elaboration and inception with neat diagram. (16)

Or

(b) (i) Explain the guidelines for finding conceptual classes with neat diagram. (10)

(ii) Explain about Aggregation and Composition with examples. (6)

14. (a) Explain the UML Class, Sequence and Interaction diagrams for Library Management System. (16)

Or

(b) State Model-View Separation principle and explain its motivations. (16)

15. (a) Explain the issues involved in OO Testing. (16)

Or

(b) Explain the following

(i) GUI Testing

(ii) OO System Testing.

Reg. No. : | | | | | | | | | | | | |

Question Paper Code : 40909

B.E./B.Tech. DEGREE EXAMINATION, APRIL/MAY 2018
Fifth Semester
Computer Science and Engineering
CS 6501 – INTERNET PROGRAMMING
(Regulations 2013)

Time : Three Hours | Maximum : 100 Marks

Answer ALL questions

PART – A (10×2=20 Marks)

1. If MyAbstractClass is an abstract class, would the following statement produce an error. Justify your answer.

   MyAbstractClass myClassInstance = new MyAbstractClass();

2. What is the advantage of using the finally block when handling exceptions ?
3. Differentiate internet and intranet.
4. When users enter a Uniform Resource Locator (URL) address, into a web browser, how is the specific document retrieved from a web server ?
5. Write the javascript methods to retrieve the data and time based on the computers locale.
6. What is the need to use JSTL tags ?
7. What is the advantage of RSS documents ?
8. Using PHP check if the word "life" is found in the text "The many lessons of life".
9. What is the need for SOAP ?
10. What are web services ?

(5×13=65 Marks)

PART – B

11. a) Explain the stages of threads in java. With examples explain the ways to create threads.

(OR)

b) Explain the methods in the lifecycle of an applet. With examples explain how to create an applet with the message "Internet Programming", call the code from html and pass parameters to applets.

12. a) Create a form in HTML5 to provide the list of grocery for the month from the list in the web site. Create using forms, labels, text boxes, lists. Allow the user to enter his details to get the grocery delivered to his house.

(OR)

b) Create a web site to get feedback from the users using CSS.

13. a) Explain DOM nodes and DOM trees. With examples show how to model a document using DOM and how to traverse and modify DOM trees.

(OR)

b) Explain the lifecycle of servlets with suitable examples.

14. a) What are cookies ? With examples differentiate session and persistent cookies and explain how to write and read cookies.

(OR)

b) Write an XML markup for a business letter and explain the elements used.

15. a) With a neat diagram explain the Ajax client server architecture. With an example differentiate classic HTML5 forms from Ajax forms. Summarize some of the XMLHttpRequest object's properties and methods.

(OR)

b) Give the basic structure of a WSDL and show how they are used to create, publish, test and describe web services.

PART – C

(1×15=15 Marks)

16. a) Create a web page for a company with buses plying in different routes. Store details of the users in the database, enable users to book tickets using the web site and display the bus ticket with fare for the users using PHP.

(OR)

b) Use CSS and javascript to create a program that allows you to drag and drop multiple images (including one with a mouse) as thumbnails. When the user clicks the image with the mouse, it should follow the cursor until the mouse button is released. When the other images are clicked, the larger version should grow from the top-left corner of the main image area till it reaches its full size. Allow the user to select the page's background color and whether the page should use serif or sans serif fonts. Then change the body element's style attribute accordingly.

Reg. No. : | | | | | | | | | | | | |

Question Paper Code : 52866

B.E./B.Tech. DEGREE EXAMINATIONS, APRIL/MAY 2019.

Fifth Semester

Computer Science and Engineering

CS 6501 — INTERNET PROGRAMMING

(Regulations 2013)

(Common to PTCS 6501 — Internet Programming for B.E. (Part-Time) for Fourth Semester – Computer Science and Engineering – Regulations 2014)

Time : Three hours | Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. Define objects and classes in java.
2. What is the need for threads?
3. Mention the difference between the Internet and Intranet.
4. Define Cascading Style Sheet.
5. Write the applications of servlets.
6. What is JSP?
7. List the rules for creating variables in PHP.
8. What is XSL?
9. List some examples of web services.
10. What is meant by call back function?

PART B — (5 × 13 = 65 marks)

11. (a) Explain the concept of inner class and its types with example for each. (13)

Or

(b) (i) Describe in detail about applet life cycle and associated methods of an applet. (10)

(ii) Write a java program to draw smiley using applet. (3)

12. (a) Describe in detail the RIA architecture. Give the merits and demerits also. (13)

Or

(b) (i) Explain the working principle of web server with a neat sketch. (8)

(ii) Summarize the difference between HTML and XHTML. (5)

13. (a) (i) Write a Java script to find the prime number between 1 and 100. (7)

(ii) Discuss the advantages and disadvantages of Servlets. (6)

Or

(b) (i) Draw the Servlet architecture and explain its working. (8)

(ii) Explain cookies with suitable examples. (5)

14. (a) Explain the types of DTD in XML with an example. (13)

Or

(b) Discuss the following in detail :

(i) RSS (7)

(ii) ATOM. (6)

15. (a) (i) Explain the XML–HttpRequest Object methods. (8)

(ii) List the pros and cons of AJAX. (5)

Or

(b) (i) Describe the major elements of a WSDL document. (7)

(ii) Write in brief about the SOAP. (6)

PART C — (1 × 15 = 15 marks)

16. (a) (i) Write a java code to simulate the way a stack mechanisms works with exception handling, throwing and dealing with exceptions such as stack is full (if you want to add more elements into the stack) or Stack is empty (you want to pop elements from the stack). (10)

(ii) Why multiple inheritance is not supported in java? Explain. (5)

Or

(b) Develop JSP program to display the grade of a student by accepting the marks of five subjects. (15)

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Reg. No. : | | | | | | | | | | | | |

Question Paper Code : 52867

B.E./B.Tech. DEGREE EXAMINATIONS, APRIL/MAY 2019.

Fifth/Sixth Semester

Computer Science and Engineering

CS 6502 — OBJECT ORIENTED ANALYSIS AND DESIGN

(Common to Information Technology)

(Regulation 2013)

Time : Three hours | Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. List the principles of modeling in UML.

2. What is Unified Modeling Language?

3. Define responsibility with an example.

4. When can we use patterns?

5. Define refinement.

6. What is aggregation?

7. Write the common uses of class diagram.

8. List out the interaction diagrams.

9. Define class testing.

10. Write about GUI testing.

PART B — (5 × 13 = 65 marks)

11. (a) Explain the conceptual model of the UML in detail? Explain various common mechanisms used in UML. (13)

Or

(b) Explain about the various phases in unified process. (13)

12. (a) (i) Differentiate bridge and adapter patterns. (7)

(ii) Explain in detail about factory method. (6)

Or

(b) (i) Compare cohesion and coupling with suitable example. (8)

(ii) Explain in detail about controller. (5)

13. (a) (i) Write the use of case modeling and explain in detail. (7)

(ii) Write a short note on domain models. (6)

Or

(b) (i) Explain in detail about conceptual classes and description classes. (5)

(ii) Differentiate aggregation and composition. (8)

14. (a) Explain about relationship between sequence and use cases in detail. (13)

Or

(b) Discuss briefly about logical architecture refinement in detail. (13)

15. (a) Give brief description about testing issues in OO testing and class testing in detail. (13)

Or

(b) Discuss briefly about testing methods applicable at the class level.

PART C — (1 × 15 = 15 marks)

16. (a) Draw the activity and class diagrams for library management system.

Or

(b) Write a short note on the following:

(i) State diagrams

(ii) Structural patterns

(iii) Associations

(iv) OO system testing.

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Reg. No. : | | | | | | | | | | | | |

Question Paper Code : 50393

B.E./B.Tech. DEGREE EXAMINATION, NOVEMBER/DECEMBER 2017
Fifth/Eighth Semester
Computer Science and Engineering
CS 6503 : THEORY OF COMPUTATION
(Common to : Information Technology)
(Regulations 2013)

Time : Three Hours | Maximum : 100 Marks

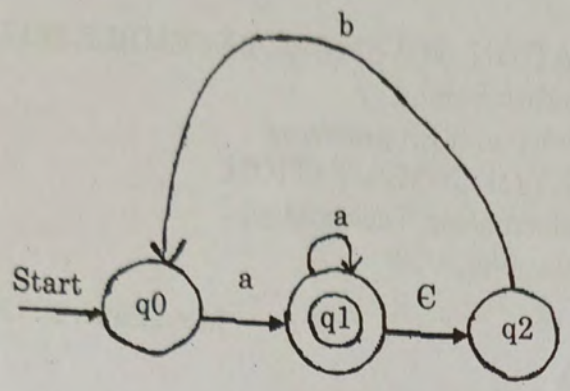
Answer ALL questions

PART – A (10×2=20 Marks)

1. Define finite automata.
2. State the definition of pumping lemma for regular set.
3. What are the closure properties of context-free languages ?
4. Derive a string 'aababa' for the following Context Free Grammar (CFG).
   $S \rightarrow aSX/b$;
   $X \rightarrow Xb/a$
5. Give the steps to eliminate useless symbols.
6. Show that $L = \{a^p/p \text{ is prime}\}$ is not context free.
7. Define Turing Machine.
8. Give the configuration of Turing machine.
9. List the properties of recursive and recursive enumerable language.
10. Write short notes on tractable problem.

PART – B (5×13=65 Marks)

11. a) Convert the Є-NFA to DFA and list the difference between NFA and DFA. (10+3)



(OR)

b) Show that the regular language are closed under : (13)

i) Union

ii) Inter section

iii) Kleen closure

iv) Complement

v) Difference.

12. a) i) Construct a CFG to generate even and odd set of palindromes over alphabet {a, b}. (7)

ii) Generate CFG for the language $L = \{0^i 1^j 0^k \mid j > i + k\}$. (6)

(OR)

b) i) Find an equivalent grammar in CNF for the grammar : (7)

$S \rightarrow bA / aB$

$A \rightarrow bAA / aS / a$

$B \rightarrow aBB / bS / b$.

ii) Eliminate the unit production of the following grammar : (6)

$S \rightarrow A / bb$

$A \rightarrow B / b$

$B \rightarrow S / a$.

13. a) i) Find PDA that accept the given CFG : (7)

$S \rightarrow xaax$

$X \rightarrow ax/bx/\epsilon$.

ii) Construct PDA for the language $a^n b^m a^{n+m}$. (6)

(OR)

b) i) Prove that deterministic and non deterministic PDA are not equivalent. (8)

ii) Explain pumping Lemma for CFL. (5)

14. a) Construct Turing Machine (TM) that replace all occurrence of 111 by 101 from sequence of 0's and 1's. (13)

(OR)

b) i) Explain techniques for Turing Machine Construction. (7)

ii) Illustrate the Chomsky grammar classification with necessary example. (6)

15. a) Explain universal Turing Machine. (13)

(OR)

b) Explain how to measure and classify complexity. (13)

PART – C (1×15=15 Marks)

16. a) Prove that Halting problem is undecidable. (15)

(OR)

b) Consider two-tape Turing machine (TM) and determine whether the TM always writes a nonblank symbol on its second tape during the computation on any input string 'w'. Formulate this problem as a language and show it is undecidable. (15)

Reg. No. : | | | | | | | | | | | | |

Question Paper Code : 20369

B.E./B.Tech. DEGREE EXAMINATION, NOVEMBER/DECEMBER 2018.

Fifth/Eighth Semester

Computer Science and Engineering

CS 6503 – THEORY OF COMPUTATION

(Common to Information Technology)

(Regulations 2013)

Time : Three hours

Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. Give the difference between a deterministic finite automaton (DFA) and a non deterministic finite automaton (NDFA).

2. State pumping lemma for regular languages.

3. Consider the context-free grammar (CFG) given below. Give the leftmost derivation for the string *bbaa* using the grammar.

   $S \rightarrow bS|aT|\in$

   $T \rightarrow aT|bU|\in$

   $U \rightarrow aT|\in$

4. Show that the following grammar is ambiguous: $S \rightarrow SbS|a$.

5. What is an instantaneous description (ID) of a push down automaton (PDA)?

6. Convert the following CFG to a push down automaton:

   $S \rightarrow aS|bS|a|b$.

7. Differentiate multihead and multitape Turing machines.

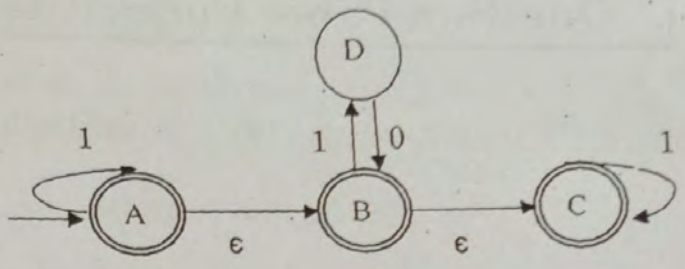
8. Give the Chomskian hierarchy of languages.

9. If L and its complement are recursively enumerable languages, prove that L is recursive.

10. Define the primitive recursion operation.

PART B — (5 × 13 = 65 marks)

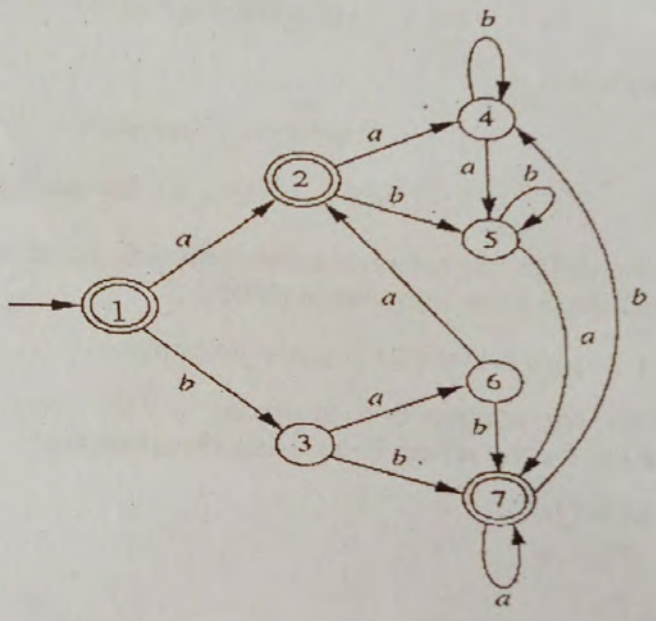
11. (a) Convert the following ∈-NFA to NFA and then convert the resultant NFA to DFA. (13)



Or

(b) (i) Prove that a language L is accepted by some NDFA if and only if L is accepted by some DFA. (6)

(ii) Minimize the following automaton: (7)



12. (a) Simplify the following grammar by eliminating null productions, unit productions and useless symbols and then convert to Chomsky Normal Form (CNF). (13)

$S \rightarrow ABC \mid BaB$

$A \rightarrow aA \mid BaC \mid aaa$

$B \rightarrow bBb \mid a \mid D$

$C \rightarrow CA \mid AC$

$D \rightarrow \in$

Or

(b) Convert the following grammar to Greibach normal form (GNF): (13)

$S \rightarrow AB, A \rightarrow BS \mid b, B \rightarrow SA \mid a$.

13. (a) (ii) Prove that the language $L = \{a^n b^n c^n \mid n >= 1\}$ is not context free using pumping lemma. (8)

(iii) What is a deterministic push down automaton? Comment on the language accepting capabilities of a deterministic push down automaton. (5)

Or

(b) Convert the following PDA M to CFG: (13)

$M = (\{q_0, q_1\}, \{0, 1\}, \{X, Z_0\}, \delta, q_0, Z_0, \Phi)$ and δ is given by

$\delta(q_0, 0, Z_0) = \{(q_0, XZ_0)\}, \delta(q_0, 1, X) = \{(q_1, \in)\}$,

$\delta(q_0, 0, X) = \{(q_0, XX)\}, \delta(q_1, \in, X) = \{(q_1, \in)\}$,

$\delta(q_0, 1, X) = \{(q_1, \in)\}, \delta(q_1, \in, Z_0) = \{(q_1, \in)\}$.

14. (a) (i) Give the five-tuple representation of a Turing machine and explain the representation. Define the language accepted by a Turing machine. (5)

(ii) Consider the following Turing machine $M = (\{q_1, q_2, q_3, q_4\}, \{0, 1\}, \{0, 1, X, B\}, \delta, q_1, B, q_4)$ where δ is given as

$\delta(q_1, 0) = (q_2, X, R)$
$\delta(q_2, 0) = (q_2, X, R)$
$\delta(q_2, 1) = (q_3, X, R)$
$\delta(q_3, 0) = (q_2, X, R)$
$\delta(q_3, 1) = (q_3, X, R)$
$\delta(q_3, B) = (q_4, X, R)$

What will be the initial and final configurations of the Turing machine for the input string w = 0101? (8)

Or

(b) Design a Turing machine that accepts the language $L = \{ss \mid s \text{ is in } \{a, b\}^*\}$. (13)

15. (a) (i) If L1 and L2 are recursively enumerable languages, prove that the union of L1 and L2 is also recursively enumerable. (8)

(ii) Write notes on polynomial-time reductions. (5)

Or

(b) What is a universal Turing Machine? Explain the procedure to construct the universal Turing machine. (13)

PART C — (1 × 15 = 15 marks)

16. (a) Give the regular expression of the language generated by the context free grammar (CFG) given below:

$S \rightarrow aS \mid bS \mid a \mid b$

Convert the regular expression to an ϵ–NFA. (7)

(b) Design a Turing machine that accepts the language $L = \{a^n b^n c^n \mid n >= 1\}$. (8)

Reg. No. : | | | | | | | | | | | | |

Question Paper Code : 91403

B.E./B.Tech. DEGREE EXAMINATIONS, NOVEMBER/DECEMBER 2019

Fifth/Eighth Semester

Computer Science and Engineering

CS6503 – THEORY OF COMPUTATION

(Common to Information Technology)

(Regulations 2013)

Time : Three Hours | Maximum : 100 Marks

Answer ALL questions

PART – A (10×2=20 Marks)

1. Define a deterministic finite automaton.
2. Draw the transition diagram for the deterministic finite automaton accepting all strings with a substring 01.
3. Define context free grammar.
4. What is a parse tree ? Give example.
5. Define pushdown automaton.
6. When a pushdown automaton can be defined to be deterministic ?
7. What is a Turing machine ?
8. Present an outline of multi-tape Turing machine.
9. When is a language L recursively enumerable ?
10. What are polynomial-time algorithms ?

PART – B (5×13=65 Marks)

11. a) Outline the steps in converting nondeterministic finite automaton to deterministic finite automaton. (13)

(OR)

b) "Not every language is a regular language". Using pumping lemma prove that many different languages are not regular. (13)

12. a) i) What are ambiguous grammars ? Give example.

ii) When is a context free grammar said to be in Chomsky normal form ? Explain with an example.

(OR)

b) i) Outline unit production and null production in a context free grammar with an example.

ii) When is a context free grammar said to be in Greibach normal form ? Explai with an example.

13. a) Given a context free grammar G, outline the steps to construct a pushdown automaton that simulates the left most derivations of G with an example.

(OR)

b) Show that the language $L = \{0^n1^n \mid n \geq 1\} \cup \{0^n1^{2n} \mid n \geq 1\}$ is a context-free language that is not accepted by any deterministic pushdown automaton.

14. a) Design a Turing machine that will accept the language $\{0^n1^n \mid n \geq 1\}$ and draw the transition diagram for the Turing machine.

(OR)

b) i) Outline the halting problem for Turing machines.

ii) Present an outline of the Chomsky hierarchy of languages.

15. a) i) Present a detailed note on primitive recursive functions.

ii) Highlight the features of universal Turing machine.

(OR)

b) i) Outline tractable and intractable problems with an example.

ii) Show that any problem in P is also in NP but not the other way around.

PART – C (1×15=15 Mark

16. a) Write regular expression for the following languages :

i) The set of all strings of 0's and 1's not containing 101 as a substring.

ii) The set of strings of 0's and 1's, whose number of 0's is divisible by five and whose number of 1's is even.

(OR)

b) Give transition tables for pushdown automata accepting each of the following languages :

i) $\{a^ib^j \mid i \leq j \leq 2i\}$

ii) $\{x \in \{a, b\}^* \mid n_a(x) < n_b(x) < 2n_a(x)\}$.

Reg. No. : | | | | | | | | | | | | |

Question Paper Code : 71684

B.E./B.Tech. DEGREE EXAMINATION, APRIL/MAY 2017.

Fifth/Eighth Semester

Computer Science and Engineering

CS 6503 — THEORY OF COMPUTATION

(Common to Information Technology)

(Regulations 2013)

Time : Three hours Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. Generate NFA-€ to represent $a^*b \mid c$.

2. Show whether a language $L = \{0^n 1^{2n} \mid n > 0\}$ is regular or not using pumping lemma.

3. Give language of regular expression $a?\ (b \mid c)^*$.

4. Generate CFG for a signed integer constant in C language.

5. Construct a rightmost derivation of $(a + b) * c$ for using the grammar, and also state that whether a given grammar is ambiguous one or not.

   E -> E + E/E*E/(E)/id.

6. Differentiate PDA acceptance by empty stack method with acceptance by the final state method.

7. Write short notes on Chomskian hierarchy of languages.

8. What is halting problem?

9. What is primitive recursive functions.

10. Define NP completeness.

PART B — (5 × 16 = 80 marks)

11. (a) Construct NFA with epsilon for the $RE = (a/b)^* ab$ and convert into DFA and further find the minimized DFA.

Or

(b) Prove for every $n >= 1$ by mathematical induction $\sum^{n} i^3 = \{n(n+1)/2\}^2$.

12. (a) Given the CFG G, find CFG G' in CNF generating the language $L(G) - \{\wedge\}$

S -> AACD

A -> aAb | ^

C -> aC | a

D -> aDa | bDb | ^

Or

(b) Convert the following grammar G into Greibach Normal Form (GNF)

S → XA | BB

B → b | SB

X → b

A → a

13. (a) (i) Construct a DPDA for even length palindrome.

(ii) Prove – If PDA P is constructed from CFG G by the above construction, then $N(P) = L(G)$.

Or

(b) Convert the following CFG to PDA and verify for $(a + b)$ and $a++$

I -> a | b | Ia | Ib | I0 | I1

E -> I | E + E | E * E | (E)

14. (a) Construct a TM to reverse the given string.

Or

(b) Explain Multi tape and Multi head Turing machine with suitable example.

15. (a) Explain recursive and recursively enumerable languages with suitable example.

Or

(b) Explain tractable and intractable problem with suitable example.

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Question Paper Code : 40911

B.E./B.Tech. DEGREE EXAMINATION, APRIL/MAY 2018

Fifth/Eighth Semester

Computer Science and Engineering

CS 6503 – THEORY OF COMPUTATION

(Common to Information Technology)

(Regulations 2013)

Time : Three Hours | Maximum : 100 Marks

Answer ALL questions

PART – A (10×2=20 Marks)

1. Define Non-deterministic Automata (NFA).
2. Write the regular expression for the set of all strings of 0's and 1's not containing 101 as substring.
3. Define Ambiguity.
4. State Chomsky normal form theorem.
5. When is PDA said to be deterministic ?
6. What are the ways of language acceptance in PDA ?
7. Define Turing Machine.
8. Define Chomsky hierarchy of language.
9. What do you mean by Universal Turing machine ?
10. When is a language said to be recursively enumerable ?

PART – B

(5×13=65 Marks)

11. a) Describe the closure properties of regular languages. (13)

(OR)

b) Determine DFA from a given NFA : (13)

$M = (\{q_0, q_1\}, \{0, 1\}, \delta, q_0, \{q_1\})$ where δ is given by

$\delta(q_0, 0) = \{q_0, q_1\}$, $\delta(q_0, 1) = \{q_1\}$, $\delta(q_1, 0) = \varphi$, $\delta(q_1, 1) = \{q_0, q_1\}$

12. a) With an example convert CFG to Greiback Normal form. (13)

(OR)

b) Explain simplification of CFG with examples. (13)

13. a) i) Construct PDA for the language $\{WCW^R/W \in \{0,1\}\}$. (8)

ii) Construct CFG for the constructed PDA. (5)

(OR)

b) i) Explain pumping lemma for Context Free Languages with example. (7)

ii) Show that Deterministic PDA is less powerful than nondeterministic PDA. (6)

14. a) Construct a Turing machine that perform unary multiplication (13)
(Say 111 × 11 = 111111).

(OR)

b) i) Elaborate on programming techniques for Turing machine construction. (5)

ii) Construct turing machine for the language $\{WW/W \in \{a,b\}\}$. (8)

15. a) i) Prove that the diagonalization language (L_d) is not a recursively enumerable. (7)

ii) Write note on primitive recursive functions. (6)

(OR)

b) Write note on NP complete problems and Polynomial time reduction. (13)

PART – C

(1×15=15 Marks)

16. a) Analyze the limitation of automata for Type 3, Type 2, Type 0 languages. (15)

(OR)

b) i) Show that Halting problem is undecidable. (10)

ii) Compare Tactable and untactable problems. (5)

Reg. No. : | | | | | | | | | | | | |

Question Paper Code : 52868

B.E./B.Tech. DEGREE EXAMINATIONS, APRIL/MAY, 2019.

Fifth/Eighth Semester

Computer Science and Engineering

CS 6503 — THEORY OF COMPUTATION

(Common to Information Technology)

(Regulation 2013)

Time : Three hours Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. Construct Finite Automata for the regular expression : $(a \mid b)^* abb$.
2. Prove that $L = \{0^n 1^n \mid n >= 1\}$ is not a regular language.
3. What is ambiguous grammar? Give example.
4. Find an unambiguous grammar for the following grammar : $E \rightarrow E+E \mid E^*E \mid (E) \mid id$.
5. Define Push Down Automata (PDA).
6. What is meant by Instantaneous Description for a PDA.
7. What is recursive enumerable language? Give example.
8. Write the applications of Turing Machine.
9. What is unsolvable problem? Give example.
10. What is Primitive Recursive Function? Give example.

PART B — (5 × 13 = 65 marks)

11. (a) Construct E-NFA for the regular expression (01 | 10) *101 and convert it into DFA. (13)

Or

(b) Elaborate the steps to convert the DFA into Regular expression with suitable example. (13)

12. (a) (i) Convert the following CFG into Griebach Normal Form: (10)

$X_1 \rightarrow X_2X_3$
$X_2 \rightarrow X_3X_1 \mid b$
$X_3 \rightarrow X_1X_2 \mid a$

(ii) Remove $\in$ - production from the following grammar

$S \rightarrow ASA \mid aB \mid b, A \rightarrow B, B \rightarrow b \mid \in .$ (3)

Or

(b) (i) Write short notes on Chomsky hierarchy of grammar. (5)

(ii) Convert the following grammar in to CNF: (5)

$S \rightarrow bA \mid aB$
$A \rightarrow bAA \mid aS \mid a$
$B \rightarrow aBB \mid bS \mid b$

(iii) Eliminate left recursion for the following grammar : (3)

$A \rightarrow A+B \mid A^*B \mid B \mid a$

13. (a) (i) Construct PDA for $L = \{a^n b^n \mid n >= 0\}$. (6)

(ii) Construct PDA for $L = \{w \in (a \mid b)^* \mid$ where 'w' is a PALINDROME$\}$. (7)

Or

(b) (i) Construct PDA for $L = \{0^n\ 1^m\ 2^{n+m} \mid$ where $n, m >= 1\}$. (6)

(ii) Illustrate the equivalence between PDA and CFL with example. (7)

14. (a) Discuss about the techniques for constructing the various types of Turing Machine. (13)

Or

(b) (i) Construct Turing Machine for
$L = \{w\varepsilon\ (a \mid b)^* \mid$ where 'w' is a PALINDROME$\}$. (8)

(ii) Construct Turing Machine for $L = \{1^n\ 2^n\ 3^n \mid$ where $n >= 1\}$. (5)

15. (a) (i) Explain in detail about the various properties of recursive and recursive enumerable languages. (8)

(ii) How does a primitive recursive function help to identify computable function. (5)

Or

(b) Describe in detail about NP-Hard and NP-Complete problems with example. (13)

PART C — (1 × 15 = 15 marks)

16. (a) (i) Construct Turing machine for language over the input alphabet $\Sigma = \{a, b\}$ to shift the input symbol two positions left. (5)

(ii) Analyze and brief the concept of tractable and intractable problems. (10)

Or

(b) (i) State and prove the pumping lemma for CFL. (7)

(ii) Write an algorithm for minimization of DFA. (8)

Reg. No. : | | | | | | | | | | | | |

Question Paper Code : 50392

B.E./B.Tech. DEGREE EXAMINATION, NOVEMBER/DECEMBER 2017
Fifth/Sixth Semester
Computer Science and Engineering
CS 6502 – OBJECT ORIENTED ANALYSIS AND DESIGN
(Common to Information Technology)
(Regulations 2013)

Time : Three Hours

Maximum : 100 Marks

Answer ALL questions

PART – A

(10×2=20 Marks)

1. Define an object. Identify the probable attributes that will be modeled in a Library database for the object BOOK.
2. Outline the purpose of using use cases, to describe requirements.
3. Define cohesion and coupling.
4. What are design patterns ?
5. When to create a subclass of a superclass ?
6. What is inception ?
7. Outline the key reason for modeling a package diagram.
8. Name the two types of UML interaction diagrams.
9. What is unit testing ?
10. Define a test case. Give example.

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PART – B (5×13=65 Marks)

11. a) i) Present an outline of object-oriented analysis and object-oriented design. (7)

ii) Why the Unified process has emerged as a popular and effective software development process ? (6)

(OR)

b) Model a state transition diagram for the following scenario : (13)

Here is what happens in a microwave oven :

- The oven is initially in an idle state with door open, where the light is turned on.
- When the door is closed it is now in idle but the light is turned off.
- If a button is pressed, then it moves to initial cooking stage, where the timer is set and lights are on and heating starts.
- At any moment the door may be opened, the cooking is interrupted, the timer is cleared and heating stops.
- Also while cooking, another button can be pushed and extended cooking state starts, where the timer gets more minutes. At any moment door can be opened here also.
- If the timer times out, then cooking is complete, heating stops, lights are off and it sounds a beep.
- When the door is open, again the oven is in idle state with the door open.

12. a) Explain with an example creator and information expert GRASP patterns. (13)

(OR)

b) Explain with an example the factory method design pattern. (13)

13. a) i) Explain with an example a concrete use case and an abstract use case. (5)

ii) Explain with an example generalization and specialization and write a note on abstract class and abstract operation. (8)

(OR)

b) i) What is multiplicity of an association ? Explain with an example the different types of multiplicities. (7)

ii) Explain with an example aggregation and composition. (6)

a) Consider the following use cases that play a role in a banking system :

i) Deposit

ii) Withdraw (Minimum balance has to be checked)

Model Sequence diagram for the above two use cases. (13)

(OR)

b) Explain with a diagram gang of four (GoF) pattern summary and relationships. (13)

5. a) i) How is class testing different from conventional testing ? Explain with an example. (7)

ii) Write a note on system testing. (6)

(OR)

b) What is integration testing ? Explain the same with respect to object oriented systems. (13)

PART – C (1×15=15 Marks)

6. a) Model a class diagram for a "Banking System". State the functional requirements you are considering. (15)

(OR)

b) i) Model a use case diagram for the following scenario : (8)

Deepthi super market wants a subsystem to process supply orders via the Web. The user will supply via a form their name, password, account number and a list of supplies along with an indication of the quantities desired. The subsystem will validate the input, enter the order into a database and generate a receipt with the order number, expected ship date and the total cost of the order. If the validation step fails, the subsystem will generate an error message describing the cause of the failure.

ii) "A component represents a modular, deployable and replaceable part of a system that encapsulates implementation and exposes a set of interfaces". Elucidate with an example. (7)

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Question Paper Code : 91402

B.E./B.Tech. DEGREE EXAMINATIONS, NOVEMBER/DECEMBER 2019

Fifth/Sixth Semester

Computer Science and Engineering

CS 6502 – OBJECT ORIENTED ANALYSIS AND DESIGN

(Common to Information Technology)

(Regulations 2013)

Time : Three Hours | Maximum : 100 Marks

Answer ALL questions

PART – A **(10×2=20 Marks)**

1. What are the three perspectives to apply UML ?
2. What are the primary goals in the design of UML ?
3. How strategy is used for design patterns ?
4. Define modular design.
5. What are the tasks performed in generalization ?
6. List out the components of a POS system.
7. List any two features of object based languages.
8. What is the significance of UML ?
9. What are the steps for mapping designs to Code ?
10. List out the issues in OO testing.

PART – B (5×13=65 Marks)

11. a) With an example, clearly discuss about the package, components and deployment diagrams. (5+4+4)

(OR)

b) Explain in detail about the interaction diagrams and also notations. (13)

12. a) i) Compare cohesion and coupling with suitable example. (5)

ii) State the role and patterns while developing system design. (8)

(OR)

b) i) Differentiate Bridge and Adapter. (5)

ii) How will you design the behavioral pattern ? With an example, explain clearly. (8)

13. a) Discuss the difference between elaboration and inception. Explain how inception are used in POS system. (13)

(OR)

b) Explain the guidelines for finding conceptual classes with neat diagram. (13)

14. a) What are System Sequence Diagrams ? What is the relationship between SSDs and Use cases ? Explain with an example.

(OR)

b) Draw a neat sketch of the logical layered architecture of NextGen application and explain the components in detail.

15. a) Give a brief note on issues in Object Oriented Testing.

(OR)

b) How will you generate source code from design using UML ? Illustrate.

PART – C (1×15=15 Marks)

16. a) Consider an elevator that has the basic functions such as moving up and down open and close doors and pick up passengers. The elevator is supposed to be used in a building having floors numbered from 1 to n. There are call buttons in the elevator corresponding to each floor. For every floor except floors 1 and n, there are two floor call buttons for the passengers to call

elevator for going up and down. There is only one down call button at floor n and one up call button in floor 1. Then the car stops at a floor, the doors are opened and the elevator light indicating the current direction the elevator is going is illuminated so that the passengers can get to know the current moving direction of the elevator. When the elevator is moving a music audio is played inside the elevator.

Draw class diagram, activity diagram and component diagram for designing this system.

(OR)

b) Library Management System (LMS) :

Problem statement :

Library management software is used to monitor and controlling the transactions in a library. This case study on the Library Management System gives us the complete information and daily transaction done in a library. We need to record and retrieve the details of books in the library which mainly focus on basic operation like adding a new book, new member, searching books, facility to borrow books and returns.

Perform the following functions :

i) Class diagram. (3)

ii) Use-case diagram. (3)

iii) Sequence diagram. (3)

iv) Collaboration diagram. (3)

v) Activity diagram. (3)

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Question Paper Code : 40910

B.E./B.Tech. DEGREE EXAMINATION, APRIL/MAY 2018
Fifth/Sixth Semester
Computer Science and Engineering
CS 6502 – OBJECT ORIENTED ANALYSIS AND DESIGN
(Common to : Information Technology)
(Regulations 2013)

Time : Three Hours | Maximum : 100 Marks

Answer ALL questions

PART – A (10×2=20 Marks)

1. Define Use Case and Actor.
2. What is Activity Diagram ? Mention the elements of an Activity Diagram.
3. Mention the list of behavioral patterns used during design phase of software development.
4. List out the types of coupling.
5. What are the tasks performed in elaboration ?
6. List out the components of a POS system.
7. When to use Package Diagrams and Collaboration diagram ?
8. How to create an Instance ?
9. What is refactoring and testing ?
10. How to use the creating methods from Interaction diagrams ?

(5×13=65 Marks)

PART – B

11. a) Consider an elevator that has the basic functions such as moving up and down open and close doors and pick up passengers. The elevator is supposed to be used in a building having floors numbered from 1 to n. There are call buttons in the elevator corresponding to each floor. For every floor except floors 1 and n, there are two floor call buttons for the passengers to call elevator for going up and down. There is only one down call button at floor n and one up call button in floor 1. Then the car stops at a floor, the doors are opened and the elevator light indicating the current direction the elevator is going is illuminated so that the passengers can get to know the current moving direction of the elevator. When the elevator is moving a music audio is played inside the elevator.

Draw class diagram, activity diagram and component diagram for designing this system. (13)

(OR)

b) Explain in detail about the interaction diagrams and also notations. (13)

12. a) Explain in detail about the GRASP pattern and also explain in designing objects with responsibilities. (13)

(OR)

b) i) Write short notes on adaptor pattern and observer pattern. (7)
ii) Compare between different categories of design patterns. (6)

13. a) Describe the strategies used to identify the conceptual classes. Describe the steps to create a domain model used for representing the conceptual classes. (13)

(OR)

b) i) Explain in detail about use case diagrams. (6)
ii) Discuss about aggregation and composition. (7)

14. a) Illustrate with an example, the relationship between sequence diagram and use cases. (13)

(OR)

b) Explain details about various static and dynamic UML important diagram with suitable example. (13)

15. a) Discuss briefly about issues in OO testing. (6)

(OR)

b) i) Explain in detail about GUI testing. (7)
ii) Comparison between OO integration testing and OO system testing.

(1×15=15 Marks)

PART – C

16. a) Discuss the various types of testing strategies in object oriented environment. (15

(OR)

b) i) Draw and discuss an analysis model for Banking system. (
ii) Explain the software development life cycle of object oriented approach. (

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Question Paper Code : 50398

B.E./B.Tech. DEGREE EXAMINATION, NOVEMBER/DECEMBER 2017

Sixth Semester

Computer Science and Engineering

CS6660 – COMPILER DESIGN

(Common to : Information Technology)

(Regulations 2013)

me : Three Hours | Maximum : 100 Marks

Answer ALL questions

PART – A (10×2=20 Marks)

1. What is an interpreter ?
2. What do you mean by Cross-Compiler ?
3. What is the role of lexical analysis phase ?
4. Define Lexeme.
5. Draw syntax tree for the expression a=b*– c+b*– c.
6. What are the three storage allocation strategies ?
7. Differentiate NFA and DFA.
8. Compare syntax tree and parse tree.
9. Draw the DAG for the statement a = (a*b+c)–(a*b+c).
10. What are the properties of optimizing compilers ?

PART – B (5×16=80 Marks)

11. a) What are compiler construction tools ? Write note on each Compiler Construction tool.

(OR)

b) Explain in detail the various phases of compilers with an example.

12. a) i) Discuss the issues involved in designing Lexical Analyzer.

ii) Draw NFA for the regular expression ab*/ab.

(OR)

b) Write an algorithm to convert NFA to DFA and minimize DFA. Give an example.

13. a) Explain LR parsing algorithm with an example.

(OR)

b) Explain the non-recursive implementation of predictive parsers with the help of the grammar.

E-> E+T | T

T->T*F | F

F->(E) | id

14. a) Explain the specification of simple type checker for statements, expressions and functions.

(OR)

b) Explain about runtime storage management.

15. a) Discuss the issues in code generation with examples.

(OR)

b) Explain briefly about the principal sources of optimization.

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Question Paper Code : 50754

B.E./B.Tech. DEGREE EXAMINATION, NOVEMBER/DECEMBER 2017

Sixth/Seventh Semester

Computer Science and Engineering

IT6004 – SOFTWARE TESTING

(Common to – Information Technology)

(Regulations 2013)

Time : Three Hours | Maximum : 100 Marks

Answer ALL questions

PART – A (10×2=20 Marks)

1. What are the objectives of software testing ?
2. Define Test Bed.
3. Compare black box and white box testing.
4. What are the basic primes that are used in a structured program ?
5. Define Unit Test. Give an example.
6. Why is it important to design test harness for testing ?
7. List the various skills needed by a test specialist.
8. What is the role of Test Summary Report.
9. What are the challenges in test automation ?
10. What are the uses of walkthrough ?

PART – B (5×16=80 Marks)

11. a) i) Explain various design defects with suitable examples. (8)

ii) Analyse tester's role in software development organization. (8)

(OR)

b) Illustrate with example the principles of software testing. (16)

12. a) Illustrate equivalence class partitioning and boundary value analysis using suitable examples. (16)

(OR)

b) Explain the significance of control flow graph and cyclomatic complexity in white box testing with a pseudo code for sum of 'n' numbers. (16)

13. a) Differentiate alpha testing from beta testing and discuss in detail about the phases in which alpha and beta testing is done. (16)

(OR)

b) Explain the different integration testing strategies for procedures and functions with suitable diagrams. (16)

14. a) Describe the components of test plan. Give examples. (16)

(OR)

b) i) Discuss in detail about various skills needed for a test specialist. (8)

ii) Explain the steps involved in forming a testing group. (8)

15. a) With a neat sketch discuss the design and architecture for test automation. (16)

(OR)

b) Discuss various metrics and measurements in software testing. Explain various types of progress metrics. (16)

Reg. No. : | | | | | | | | | | | | |

Question Paper Code : 20374

B.E./B.Tech. DEGREE EXAMINATION, NOVEMBER/DECEMBER 2018.

Sixth Semester

Computer Science and Engineering

CS 6660 — COMPILER DESIGN

(Common to Information Technology)

(Regulations 2013)

(Also common to PTCS 6660 — Compiler Design – for B.E. (Part-Time) Fifth Semester – Computer Science and Engineering – Regulations 2014)

Time : Three hours Maximum : 100 marks

Answer ALL questions.

PART A — ($10 \times 2 = 20$ marks)

1. Recall the basic the two parts of a compilation process.

2. How a source code is translated to machine code?

3. State the rules to define regular expression.

4. Construct Regular expression for the language $L = \{w \in \{a, b\} / w$ ends in $abb\}$.

5. What are the different stages that a parser can recover from a syntactic error?

6. Define LR (0) item.

7. List three kinds of intermediate representation.

8. When procedure call occurs, what are the steps taken?

9. State the problems in code generation.

10. Define common sub expression.

PART B — (5 × 13 = 65 marks)

11. (a) Write short notes about : (7)

(i) Compiler Construction Tools. (6)

(ii) Lexeme, token and pattern.

Or

(b) Discuss in detail about the operations of compiler which transforms the source program from one representation into another. Illustrate the output for the input : (13)

$a = (b + c) * (b + c) * 2$.

12. (a) Write briefly about :

(i) the role of Lexical analyzer with the possible error Recovery actions. (5)

(ii) recognition and specification of tokens. (8)

Or

(b) Construct the minimized DFA for the regular expression $(0+1)*(0+1)01$. (13)

13. (a) Show that the following grammar

$S \rightarrow Aa \mid bAc \mid dc \mid bda$

$A \rightarrow a$

is LALR(1) but not SLR(1). (13)

Or

(b) Show that the following grammar

$S \rightarrow Aa \mid bAc \mid Bc \mid bBa$

$A \rightarrow d$

$B \rightarrow d$

is LR(1) but not LALR(1). (13)

14. (a) Apply the S-attributed definition and constructs syntax trees for a simple expression grammar involving only the binary operators + and –. As usual, these operators are at the same precedence level and are jointly left associative. All nonterminal have one synthesized attribute node, which represents a node of the syntax tree.

Production: $E \rightarrow E_1 + T$, $E \rightarrow T$, $T \rightarrow (E)$, $T \rightarrow$ id/num . (13)

Or

(b) Discuss in detail about :

(i) Storage allocation strategies. (7)

(ii) Parameter passing methods. (6)

15. (a) Discuss in detail about optimization of basic blocks. (13)

Or

(b) Explain in detail about issues in the design of a code generator. (13)

PART C — (1 × 15 = 15 marks)

16. (a) Suppose we have a production $A \rightarrow B\ C\ D$. Each of the four nonterminals has two attributes s, which is synthesized, and i, which is inherited. For each set of rules below, check whether the rules are consistent with (i) an S-attributed definition, (ii) an L-attributed definition (iii) any evaluation order at all.

(1) $A.s = B.i + C.i$

(2) $A.s = B.i + C.s$ and $D.i = A.i + B.s$

(3) $A.s = B.s + D.s$

(4) $A.s = D.i$
$B.i = A.s + C.s$
$C.i = B.s$
$D.i = B.i + C.i$. (15)

Or

(b) Construct a Syntax-Directed Translation scheme that translates arithmetic expression from infix into postfix notation. (15)

Reg. No. : | | | | | | | | | | | | |

Question Paper Code : 91408

B.E./B.Tech. DEGREE EXAMINATIONS, NOVEMBER/DECEMBER 2019

Sixth Semester

Computer Science and Engineering

CS 6660 – COMPILER DESIGN

(Common to Information Technology)

(Regulations 2013)

(Also common to PTCS 6660 – Compiler Design for B.E. (Part-Time) Fifth Semester – Computer Science and Engineering – Regulations 2014)

Time : Three Hours | Maximum : 100 Marks

Answer ALL questions

PART – A (10×2=20 Marks)

1. Name a compiler construction tool used to design i) Lexical Analyser and ii) Parser.
2. Which phase (or phases) of a compiler
   i) is/are considered the "back end" ?
   ii) access (es) the symbol table (for reading or writing) ?
   iii) check (s) for type mismatches ?
   iv) is/are independent of the underlying machine ?
3. Consider the language of all strings from the alphabet {a, b, c} containing the substring "abcabb". Write a regular expression that describes this language.
4. Give any two reasons for keeping lexical analyser a separate phase instead of making it an integral part of syntax analysis.
5. Show that the grammar, $S \rightarrow aSbS \mid bSaS \mid \varepsilon$ is ambiguous.
6. Give the structure of YACC program to design a simple syntax analyser.
7. Differentiate implicit and explicit type conversions.

8. What is an activation record ? Give the structure of an activation record.

9. Construct a DAG for the following code

   a = b + c

   b = a – d

   c = b + c

   d = a – d

10. What is the cost of the following sequences of instructions ?

    i) MOV b, a
       ADD c, a

    ii) MOV * R1, *R0
        ADD * R2, *R0

(1)

(1)

PART – B

(5×13=65 Marks)

11. a) What are the different phases of a compiler ? Write their functions. Show how the high level language statement position = initial + rate * 60 is converted to machine code by each phase.

(OR)

b) What are the components of a language processing system ? Explain the role of each of these components in a typical compilation and execution of the program.

12. a) Given the regular expression (a | b)*abb over the alphabet Σ = {a, b}

    i) Construct a NFA with ε-transitions using Thompson Construction. (4)

    ii) Convert the NFA obtained from (i) to non-minimal DFA. (5)

    iii) Minimize the number of states obtained from ii) to minimal DFA. (4)

(OR)

b) Write a lex program to implement a calculator. Describe the actions of the program and the functions defined and used.

13. a) Consider the following grammar G :

    $S' \rightarrow S$

    $S \rightarrow CC$

    $C \rightarrow cC \mid d$

    Construct the LALR parsing table for the grammar G. Show the moves of the parser on the string ccd

(OR)

b) Explain the construction of predictive parsing table and describe the moves of the parser on an input string. Design a predictive parser for the following grammar

$E \rightarrow E + T \mid T$

$T \rightarrow T * F \mid F$

$F \rightarrow (E) \mid id$

Show the moves of the parser on the input id + id * id.

14. a) What is a syntax tree ? Describe construction of syntax trees for expressions ? Give examples to support your description. Write syntax directed definition for constructing syntax trees/Draw an annotated parse tree for the expression a – 4 + c.

(OR)

b) What is a symbol table ? What type of information is stored in it ? Discuss on the use of the data structures i. arrays ii. Linked lists iii. Binary search trees for implementing a symbol table.

15. a) What are the principal sources of optimization ? Explain with suitable examples.

(OR)

b) Write a simple code generator algorithm. With an example code, show how the algorithm generates code.

PART – C (1×15=15 Marks)

16. a) Consider the following grammar G :

$S \rightarrow XaY \mid Y$

$X \rightarrow bY \mid c$

$Y \rightarrow X$

i) Discuss the various steps involved in the construction of SLR parsing. (3)

ii) Show the canonical collection of LR(0) items. (5)

iii) Construct the SLR parsing table. (4)

iv) Show the action of the parser on the input string cac$. (3)

(OR)

b) Consider the code

```
01          a = 1
02          b = 2
03 L0:      c = a + b
04          d = c – a
05          if c < d goto L2
06L1:       d = b + d
07          if d < 1 goto L3
08L2:       b = a + b
09          e = c – a
10          if e = 0 goto L0
11          a = b + d
12          b = a – d
13          goto L4
14L3:       d = a + b
15          e = e + 1
16          goto L3
17L4:       return
```

For the code shown above, determine the following :

i) The basic blocks of instructions (3)

ii) The control-flow graph (CFG) (3)

iii) For each variable, its corresponding def-use chain (3)

iv) The live variables at the end of each basic block. You do not need to determine the live variables before and after each basic block and justify your answer for the value presented for the basic block containing instructions at line 6 and 7. (3)

v) Is the live variable analysis a forward or backward data-flow analysis problem ? Why and what does guarantee its termination when formulated as a data-flow analysis iterative problem ? (3)

Reg. No. : | | | | | | | | | | | | |

Question Paper Code : 71689

B.E./B.Tech. DEGREE EXAMINATION, APRIL/MAY 2017.

Sixth Semester

Computer Science and Engineering

CS 6660 — COMPILER DESIGN

(Common to Information Technology)

(Regulations 2013)

Time : Three hours | Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. Define the two parts of compilation.

2. List the cousins of the compiler?

3. Write a regular expression for an identifier and number.

4. What are the various parts in LEX program?

5. Eliminate the left recursion for the grammar A→ Ac | Aad | bd.

6. What are the various conflicts that occur during shift reduce parsing?

7. What do you mean by binding of names?

8. Mention the rules for type checking.

9. What is a basic block?

10. What do you mean by copy propagation?

PART B — (5 × 16 = 80 marks)

11. (a) What are the phases of the compiler? Explain the phases in detail. Write down the output of each phase for the expression a : = b + c *60. (16)

Or

(b) (i) Explain briefly about compiler construction tools. (6)

(ii) Describe in detail about Cousins of compiler? (4)

(iii) Draw the transition diagram for relational operators and unsigned numbers. (6)

12. (a) Convert the Regular Expression abb (a | b)* to DFA using direct method and minimize it. (16)

Or

(b) (i) Differentiate between lexeme, token and pattern. (6)

(ii) What are the issues in lexical analysis? (4)

(iii) Draw the transition diagram for relational operators and unsigned numbers. (6)

13. (a) Construct a predictive parsing table for the grammar

$S \rightarrow (L) \mid a$

$L \rightarrow L, S \mid S$.

and show whether the following string will be accepted or not. (a,(a,(a,a))). (16)

Or

(b) Consider the following Grammar

E → E+T | T

T → TF | F

F → F* | a | b

Construct the SLR parsing table for the above grammar. (16)

14. (a) What are the different storage allocation strategies? (16)

Or

(b) (i) Explain in detail about Specification of a simple type checker (10)

(ii) Explain about the parameter passing. (6)

15. (a) Discuss the various issues in design of Code Generator. (16)

Or

(b) (i) Explain in detail about optimization of Basic Blocks. (8)

(ii) Construct the DAG for the following Basic Block. (8)

1. t1 : = 4*i
2. t2 : = a[t1]
3. t3 : = 4*i
4. t4 : = b[t3]
5. t5 : = t2*t4
6. t6 : = prod+t5
7. prod : = t6
8. t7 : = i+1
9. i : = t7
10. if i < = 20 goto (1).

Reg. No. : | | | | | | | | | | | | |

Question Paper Code : 40916

B.E./B.Tech. DEGREE EXAMINATION, APRIL/MAY 2018
Sixth Semester
Computer Science and Engineering
CS 6660 – COMPILER DESIGN
(Common to Information Technology)
(Regulations 2013)

Time : Three Hours | Maximum : 100 Marks

Answer ALL questions

PART – A (10×2=20 Marks)

1. State the two main parts of compilation and its function.
2. Describe the possible error recovery actions in lexical analyzer.
3. Apply the rules used to define a regular expression. Give example.
4. What do you mean by Handle Pruning ?
5. Summarize the merits and demerits of LALR parser.
6. Draw the activation tree for the following code.

```
int main ( )
{
   printf("Enter Your Name");
   scanf("%s", username);
   int show_data(username);
   printf("Press Any Key to Continue...");
   ...
   int show_data(char *user)
{
   printf(" Your Name is %s", username);
   return 0;
}
}
```

7. How do you identify predictive parser and non-recursive predictive parser ?
8. Name different storage allocation strategies used in run time environment.
9. Mention various techniques used for loop optimization.
10. List out the primary structure preserving transformations on basic block.

PART – B (5×13=65 Marks)

11. a) i) Draw a diagram for the compilation of a machine language processing system. (5)

ii) Apply the analysis phases of compiler for the following assignment statement. (8)

position := initial + rate * 60.

(OR)

b) i) Show the transition diagram for relational operators and unsigned numbers. (8)

ii) Outline the construction tools can be used to implement various phases of a compiler. (5)

12. a) i) Considering the alphabet $\Sigma = \{0, 1\}$. Construct a Non-Deterministic-Finite Automata (NFA) using the Thompson construction that is able to recognize the sentences generated by the regular expression $(1 * 01 * 0) * 1 *$. (8)

ii) Illustrate how does LEX work ? (5)

(OR)

b) Consider the regular expression below which can be used as part of a specification of the definition of exponents in floating-point numbers. Assume that the alphabet consists of numeric digits ('0' through '9') and alphanumeric characters ('a' through 'z' and 'A' through 'Z') with the addition of a selected small set of punctuation and special characters. (say in this example only the characters '+' and '–' are relevant). Also, in this representation of regular expressions the character '.' denotes concatenation.

Exponent = (+ | – | ε). (E | e) . (digit) +

i) Derive an NFA capable of recognizing its language using the Thompson construction.

ii) Derive the DFA for the NFA found in a) above using the subset construction.

iii) Minimize the DFA found in (ii) above using the interactive refinement algorithm described in class. (13)

13. a) Consider the Context-Free Grammar (CFG) depicted below where "begin", "end" and "x" are all terminal symbols of the grammar and stat is considered the starting symbol for this grammar. Productions are numbered in parenthesis and you can abbreviate "begin" to "b" and "end" to "e" respectively.

Stat → Block

Block → begin Block end

Block → Body

Body → x

i) Compute the set of LR(1) items for this grammar and draw the corresponding DFA. Do not forget to augment the grammar with the initial production S → Start$ as the production (0).

ii) Construct the corresponding LR parsing table. (13)

(OR)

b) i) Consider the following CFG grammar over the non-terminals {X, Y, Z} and terminals {a, c, d} with the productions below and start symbol Z. (6)

$X \rightarrow a$
$X \rightarrow Y$
$Z \rightarrow d$
$Z \rightarrow X\ Y\ Z$
$Y \rightarrow c$
$Y \rightarrow \varepsilon$

Compute the FIRST and FOLLOW sets of every non-terminal and the set of non-terminals that are *nullable*.

ii) Consider the following CFG grammar, (7)

$S \rightarrow aABe$
$A \rightarrow Abc \mid b$
$B \rightarrow d$

where a, b, c, d, e are terminals, 'S' (start symbol), A and B are non-terminals.

a) Parse the sentence " **abbcde** " using right-most derivations.

b) Parse the sentence " **abbcde** " using left-most derivations.

c) Draw the parse tree. (6)

14. a) i) Describe about the contents of activation record.

ii) Create a parse trees for the following string : string **id + id – id**. Check whether the string is ambiguous or not. (7)

(OR)

b) i) Explain about various ways to pass a parameter in a function with example. (6)

ii) Construct a Syntax-Directed Translation scheme that translates arithmetic expressions from infix into postfix notation. Using semantic attributes for each of the grammar symbols and semantic rules, Evaluate the input : **3 * 4 + 5 * 2**. (7)

15. a) i) Determine the basic blocks of instructions, Control Flow Graph (CFG) and the CFG dominator tree for following the code. (7)

```
01          a = 1
02          b = 0
03    L0 :  a = a + 1
04          b = p + 1
05          if (a > b) goto L3
06    L1:   a = 3
07          if (b > a) goto L2
08          b = b + 1
09          goto L1
10    L2:   a = b
11          b = p + q
12          if (a > b) goto L0
13    L3:   t1 = p * q
14          t2 = t1 + b
15          return t2
```

ii) Construct a code sequence and DAG for the following syntax directed translation of the expression : **(a + b) – (e – (c + d))**. (6)

(OR)

b) i) Translate the following assignment statement into three address code.
D:= (a - b) * (a - c) + (a – c)
Apply code generation algorithm, generate a code sequence for the three address statement. (7)

ii) Summarize the issues arise during the design of code generator. (6)

PART – C (1×15=15 Marks)

16. a) Draw the symbol tables for each of the procedures in the following PASCAL code (including main) and show their nesting relationship by linking them via a pointer reference in the structure (or record) used to implement them in memory. Include the entries or fields for the local variables, arguments and any other information you find relevant for the purposes of code generation, such as its type and location at run-time.

```
01:  procedure main
02:  integer a, b, c;
03:  procedure f1 (a, b);
04:  integer a, b;
05:  call f2(b, a);
06:  end;
07:  procedure f2(y,z);
08:  integer y, z;
09:  procedure f3(m,n);
10:  integer m, n;
11:  end;
12:  procedure f4(m,n);
13:  integer m, n;
14:  end;
15:  call f3(c,z);
16:  call f4(c,z);
17:  end;
18:  ...
19:  call f1(a, b);
20:  end;
```

(OR) (15)

b) Consider the following grammar
E → E + E
E → E * E
E → (E)
E → id
i) Find the SLR parsing table for the given grammar.
ii) Parse the sentence : (a +b) * c. (15)

Reg. No. :

Question Paper Code : 50396

./B.Tech. DEGREE EXAMINATION, NOVEMBER/DECEMBER 2017

Sixth Semester

Computer Science and Engineering

CS 6601 – DISTRIBUTED SYSTEMS

(Common to : Information Technology)

(Regulations 2013)

ree Hours

Maximum : 100 Marks

Answer ALL questions.

PART – A

(10×2=20 Marks)

e Transparency.

ny two resources of hardware and software, which can be shared in distributed
ns with example.

are the three types of communication paradigm in distributed system ?

entiate persistent and non-persistent connections.

he characteristics of peer-to-peer middleware.

is naming and locating facility ?

are the techniques used to synchronize clocks ?

down the types of messages in Bully algorithm.

thread operations are the most significant in cost ?

are the priority assignment policies ?

PART – B (5×16=80 Marks)

11. A) Write a brief note on each of the challenges of distributed systems. (16)

(OR)

B) Elucidate the trends in distributed systems. (16)

12. A) Explain in detail about the fundamental model of communication in distributed systems. (16)

(OR)

B) Explain in detail the RPC architecture with the functionality of its components. (16)

13. A) Discuss about the Pastry Routing Algorithm in detail. (16)

(OR)

B) i) Briefly describe about the file accessing models in distributed environment. (10)

ii) What is name cache ? List out its types. Also discuss about the working of LDAP. (3+3)

14. A) i) Examine how mutual exclusion is handled in distributed system. (8)

ii) Examine briefly about global states. (8)

(OR)

B) i) Discuss in detail about one phase and two phase atomic commit protocol (flat and hierarchical). (8)

ii) Write in detail about CODA. (8)

15. A) Define threads. Explain all multithreading models and thread issues. (16)

(OR)

B) List out the issues in load balancing algorithm. Discuss about any four policies of load balancing algorithm. (16)

Reg. No. : | | | | | | | | | | | | |

Question Paper Code : 20372

B.E./B.Tech. DEGREE EXAMINATION, NOVEMBER/DECEMBER 2018.

Sixth Semester

Computer Science and Engineering

CS 6601 — DISTRIBUTED SYSTEMS

(Common to Information Technology)

(Regulations 2013)

Time : 3 hours Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. What is location aware computing?
2. State any four factors to be considered for variations in client server model.
3. Compare the communicating entities : Object, components and web services.
4. "Tiered architectures are complementary to layering" — Comment.
5. What is Napster?
6. Define Gnutella.
7. List the methods to ensure serializability.
8. State the issues in Clocks.
9. Draw the pictorial representation of lifecycle of Java Thread.
10. What is User-Mode Scheduling (UMS)?

PART B — (5 × 13 = 65 marks)

11. (a) (i) What is the need for distributed system? List the distributed systems challenges. (5)

(ii) Identify the five types of hardware resource and five types of data or software resource that can be shared efficiently. Give examples.(8)

Or

(b) (i) Elaborate the design issues to be considered for spontaneous networking. (5)

(ii) A user arrives at a railway station for the first time, carrying a PDA that is capable of wireless networking. Suggest how the user could be provided with information about the local services and amenities at that station, without entering the station's name or attributes. What are the technical challenges to be addressed? (8)

12. (a) (i) Discuss on Distributed Shared Memory (DSM) with suitable illustrations. (8)

(ii) Consider a simple server that carries out client requests without accessing other servers. Explain why it is generally not possible to set a limit on the time taken by a server to respond to a client request. What should the server do, to execute requests within a bounded time? (5)

Or

(b) (i) What is Publish-Subscriber Systems? Explain its characteristic features with neat sketch. (8)

(ii) Classify and tabulate the arbitrary failures with respect to class, affects and comments. (5)

13. (a) What is Pastry? Explain the Pastry's Routing Algorithm with pseudo-code. (13)

Or

(b) (i) Explain File Service Architecture and Andrew File System with suitable sketch. (10)

(ii) State the differences between Overlay networks and IP routing. (3)

14. (a) (i) State the problems in Cristian's algorithm. Explain how Berkeley algorithm overcomes the problems of Cristian's algorithm with neat sketch. (8)

(ii) Describe the Central Sever Algorithm with neat sketch. State its performance measures. (5)

Or

(b) Elucidate Coda architecture with respect to file systems, communication coda and processes in coda with necessary block diagrams. (13)

15. (a) (i) State the issues in load balancing algorithms. (5)

(ii) What is Process Migration? State the issues in migration. Describe Negotiation in Migration process with neat sketch. (8)

Or

(b) (i) Give a brief account on desired features of scheduling algorithms. (5)

(ii) Define Thread. Elucidate the actions involved in multithreaded architecture and multithreaded models with appropriate sketch. (8)

PART C — (1 × 15 = 15 marks)

16. (a) A client makes remote procedure calls to a server. The client takes 5 milliseconds to compute the arguments for each request, and the server takes 10 milliseconds to process each request. The local operating system processing time for each send or receive operation is 0.5 milliseconds, and the network time to transmit each request or reply message is .3 milliseconds. Marshalling or unmarshalling takes 0.5 milliseconds per message.

(i) Calculate the time taken by the client to generate and return from two requests :

(1) if it is single-threaded, and (4)

(2) if it has two threads that can make requests concurrently on a single processor. Context-switching time can be ignored. (8)

(ii) Is there a need for asynchronous RPC if client and server processes are threaded? (3)

Or

(b) (i) A client attempts to synchronize with a time server. It records the round-trip times and timestamps returned by the server is given in the table below. Which of these times should it use to set its clock? To what time should it set it? Estimate the accuracy of the setting with respect to the server's clock.

Round-trip (ms)	Time (hr:min:sec)
22	10:54:23.674
25	10:54:25.450
20	10:54:28.342

If the minimum time between sending and receiving a message in the system is 8 ms, is there any change in the derived solution? (7)

(ii) Two processes P and Q are connected in a ring using two channels and they constantly rotate a message m. At any one time, there is only one copy of m in the system. Each process's state consists of the number of times it has received m and P sends m first. At a certain point P, has the message and its state is 101. Immediately after sending m, P initiates the snapshot algorithm. Explain the operation of the algorithm in this case, giving the possible global state(s) reported by the algorithm. (8)

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Reg. No. : | | | | | | | | | | | | |

Question Paper Code : 91406

B.E./B.Tech. DEGREE EXAMINATIONS, NOVEMBER/DECEMBER 2019

Sixth Semester

Computer Science and Engineering

CS6601 – DISTRIBUTED SYSTEMS

(Common to : Information Technology)

(Regulations 2013)

Time : Three Hours | Maximum : 100 Marks

Answer ALL questions

PART – A (10×2=20 Marks)

1. List the challenges in the design of distributed systems.
2. Define pervasive networking.
3. What are the three important aspects of distributed systems that are modeled using fundamental models ?
4. What is marshalling ?
5. State any four characteristics of peer to peer systems.
6. What are the limitations of napster ?
7. Why does cascading aborts occur ?
8. What are the tasks of recovery manager ?
9. What is Load Sharing ?
10. "Thread is a lightweight process". Justify with an example.

PART – B (5×13=65 Marks)

11. a) Explain in detail about the trends in distributed systems. (13)

(OR)

b) Consider a World Wide Web (WWW) distributed application design. Describe the characteristics and challenges in the above design when considering resource sharing phenomenon. (13)

12. a) Discuss about overlay networks with Skype as an example. (13)

(OR)

b) Write in detail about publish subscribe networks with a suitable example. (13)

13. a) Explain how does Andrew file system ensure the cached copies of files are up-to-date when files are updated by several clients. (13)

(OR)

b) Explain in detail about the squirrel web caching service based on Pastry. (13)

14. a) Discuss in detail about the following distributed mutual exclusion algorithms

1) The Central Server Algorithm

2) Ring Based Algorithm. (13)

(OR)

b) Why is computer clock synchronization necessary ? Describe the design requirements for a system to synchronize the clocks in a distributed system. (13)

15. a) What is context switching ? Describe in detail about process migration. (13)

(OR)

b) Discuss in detail about the Load Balancing approach in a peer-peer system. (13)

PART – C

(1×15=15 Marks)

16. a) The Enterprise Java Beans architecture will be suitable to implement a massively multiplayer online games. If yes, give appropriate solutions. (15)

(OR)

b) Discuss whether message passing or DSM is preferable for fault-tolerant applications. (15)

Reg. No. : | | | | | | | | | | | | |

Question Paper Code : 71687

B.E./B.Tech. DEGREE EXAMINATION, APRIL/MAY 2017.

Sixth Semester

Computer Science and Engineering

CS 6601 — DISTRIBUTED SYSTEMS

(Common to Information Technology)

(Regulations 2013)

Time : Three hours Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. What is the need of openness in Distributed system?

2. Define Transparency. What are its types?

3. State the advantages of overlay networks.

4. Differentiate between RMI and RPC.

5. What are the main tasks of routing overlay?

6. How will you make use of name space and DNS?

7. Define consistent cut.

8. What are the rules to abort the nested transaction?

9. What are the sub activities involved in process migration?

10. What is the basic idea behind task assignment approach?

PART B — (5 × 16 = 80 marks)

11. (a) (i) What are the design issues to be considered in designing distributed systems? Explain in detail about each of them. (8)

(ii) Discuss in detail about the trends in distributed systems. (8)

Or

(b) (i) Discuss in detail about the examples (any two) of distributed systems. (8)

(ii) Utilize World Wide Web as an example to illustrate the concept of resource sharing, client and server. (8)

12. (a) (i) Explain in detail about Middleware layers and Inter process communication. (8)

(ii) What is the purpose of external data representation and marshaling? Discuss. (8)

Or

(b) (i) What is RMI? How it is implemented? Write notes on JAVA RMI. (8)

(ii) How message queues are useful? Explain briefly. (8)

13. (a) (i) What is meant by Napster legacy? Explain in detail. (8)

(ii) Explain in detail about routing overlay employed in Ocean store storage system. (8)

Or

(b) (i) Discuss the mounting issues of remote file systems on NFS client. (8)

(ii) List the different approaches to implement the Name Caches and explain them briefly. (8)

14. (a) (i) Explain the Chandy and Lamports Snapshot algorithm for determining the global states of distributed systems. (8)

(ii) Describe the distributed mutual exclusion algorithm that uses multicast and logical clocks. (8)

Or

(b) (i) Explain detail about two phase commit protocol. (8)

(ii) Summarize in detail about CODA. (8)

15. (a) (i) Explain how process migration is implemented in heterogeneous system. (8)

(ii) Discuss the issues related to thread programming, thread lifetime and thread synchronization. (8)

Or

(b) (i) Describe in detail about the Load balancing approach. (8)

(ii) Give the techniques and methodologies for scheduling process of a distributed system. (8)

Reg. No. : | | | | | | | | | | | | |

Question Paper Code : 52871

B.E./B.Tech. DEGREE EXAMINATIONS, APRIL/MAY 2019.

Sixth Semester

Computer Science and Engineering

CS 6601 — DISTRIBUTED SYSTEMS

(Common to Information Technology)

(Regulation 2013)

Time : Three hours Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. What is distributed system?
2. What are the three main standard technological components of Web?
3. Compare RMI with RPC.
4. What is meant by marshalling and unmarshalling?
5. What is the need for peer-peer middleware system?
6. What is LDAP?
7. Why is computer clock synchronization necessary?
8. What is phantom deadlock?
9. Differentiate between load balancing and load sharing approach for scheduling processes.
10. What are the benefits of process migration in distributed systems?

PART B — (5 × 13 = 65 marks)

11. (a) Describe the trends in the distributed systems in detail. (13)

Or

(b) Discuss the major issues in distributed systems. (13)

12. (a) What is overlay network? Explain types of overlay in detail. (13)

Or

(b) (i) What is group communication? Give any two key application areas of group communication is distributed systems. (5)

(ii) Explain the role of proxy and skeleton in remote method invocation. (8)

13. (a) (i) Differentiate IP and overlay routing for peer-to-peer applications. (7)

(ii) Explain file service architecture in detail. (6)

Or

(b) (i) How does AFS ensure that the cached copies of files are up-to-date when files may be updated by several clients? (4)

(ii) Explain the Pastry's routing algorithm. (9)

14. (a) Describe Maekawa's algorithm for mutual exclusion. (13)

Or

(b) Give the distributed algorithm for deadlock detection and illustrate with an example. (13)

15. (a) Discuss about the issues in design load balancing algorithms. (13)

Or

(b) Describe the issues in designing thread packages. (13)

PART C — ($1 \times 15 = 15$ marks)

16. (a) In the ring-base election algorithm. two or more processes may almost simultaneously discover that the coordinator has crashed and then each one may circulate an election message over the ring. Although this does not cause any problem in the election, it results in waste of network bandwidth. Modify the algorithm so that only one election message circulates completely round the ring and others are detected and killed as soon as possible.

Or

(b) In client server model that is implemented by using a simple RPC mechanism, after making an RPC request, a client keeps waiting until a reply is received from the server for its request. It would be more efficient to allow the client to perform other jobs while the server is processing its request. Develop a mechanism that may be used in this case to allow a client to perform other jobs while the server is processing its requests.

Reg. No. : | | | | | | | | | | | | |

Question Paper Code : 50397

B.E./B.Tech. DEGREE EXAMINATION, NOVEMBER/DECEMBER 2017

Fifth/Sixth Semester

Computer Science and Engineering

CS 6659 – ARTIFICIAL INTELLIGENCE

(Regulations 2013)

(Common to Electronics and Instrumentation Engineering, Instrumentation and Control Engineering, Information Technology)

me : Three Hours | Maximum : 100 Marks

Answer ALL questions

PART – A (10×2=20 Marks)

1. State the advantages of Breadth First Search.
2. What is Commutative production system ?
3. Convert the following into Horn clauses.

   $\forall x : \forall y : cat(x) \vee fish(y) \rightarrow likes - to - eat(x, y)$
4. Differentiate forward and backward reasoning.
5. Define Fuzzy reasoning.
6. Compare production based system with frame based system.
7. Define adaptive learning.
8. What is hierarchical planning ?
9. List the characteristic features of expert system.
10. What is MOLE ?

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PART – B

(5×13=65 Marks)

11. a) Explain the following types of Hill Climbing search techniques. (4)

i) Simple Hill Climbing. (5)

ii) Steepest-Ascent Hill Climbing. (4)

iii) Simulated Annealing.

(OR)

b) Discuss Constraint Satisfaction problem with an algorithm for solving a Cryptarithmetic problem. (13)

12. a) Consider the following sentences : (13)

- John likes all kinds of food
- Apples are food
- Chicken is food
- Anything anyone eats and isn't killed by is food
- Bill eats peanuts and is still alive
- Sue eats everything Bill eats.

i) Translate these sentences intoformulas in predicate logic.

ii) Convert the formulas of part a into clause form.

(OR)

b) Trace the operation of the unification algorithm on each of the following pairs of literals : (13)

i) f(Marcus) and f(Caesar)

ii) f(x) and f(g(y))

iii) f(Marcus, g(x, y)) and f(x, g(Caesar, Marcus)).

13. a) Explain the production based knowledge representation technique. (13)

(OR)

b) i) Discuss about Bayesian Theory and Bayesian Network. (6)

ii) Describe in detail about Dempster-Shafer theory. (7)

a) Write short notes on the

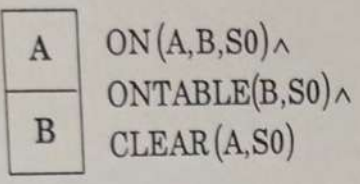
i) Learning by Parameter Adjustment. (4)

ii) Learning with Macro-Operators. (4)

iii) Learning by Chunking. (5)

(OR)

b) i) Write down STRIPs-style operators that corresponds to the following blocks world description. (8)



ii) Write short notes on Nonlinear Planning using Constraint Posting. (5)

5. a) Explain the following expert systems : (7)

i) MYCIN. (6)

ii) DART.

(OR)

b) Explain the expert system architectures : (4)

i) Rule-based system architecture. (3)

ii) Associative or Semantic Network Architecture. (3)

iii) Network architecture. (3)

iv) Blackboard System Architectures. (3)

PART – C (1×15=15 Marks)

16. a) Design an expert system for Travel recommendation and discuss its roles.

(OR)

b) Analyse any two machine learning algorithms with an example.

Reg. No. : | | | | | | | | | | | | |

Question Paper Code : 20373

B.E./B.Tech. DEGREE EXAMINATION, NOVEMBER/DECEMBER 2018.

Fifth Semester

Computer Science and Engineering

CS 6659 — ARTIFICIAL INTELLIGENCE

(Common to Electronics and Instrumentation Engineering, Instrumentation and Control Engineering and Information Technology)

(Regulations 2013)

(Also Common to PTCS 6659 – Artificial Intelligence for B.E. (Part-time) Fifth Semester – Computer Science and Engineering – Regulation 2014)

Time : Three hours Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. Write the ways to formulate a problem.

2. What is problem graph?

3. Differentiate declarative and procedural knowledge.

4. State how knowledge is represented using structured format.

5. Differentiate propositional and first order logic.

6. State Generalized Modus ponens.

7. Differentiate supervised learning and unsupervised learning.

8. List the purpose of STRIPS language.

9. Define Localization and list their techniques.

10. Write about Meta Knowledge acquisition in expert Systems

PART B — (5 × 13 = 65 marks)

11. (a) Elaborate on the following search technique

(i) Greedy best-first search (5)

(ii) A* search (5)

(iii) Memory bounded heuristic search. (3)

Or

(b) Explain Backtrack searching for Constraint Satisfaction Problem for Map Coloring Problem. (13)

12. (a) Relate first order logic with proposition logic and discuss in detail about the same. (13)

Or

(b) Describe a procedure for converting a sentence to CNF with an example. (13)

13. (a) Discuss about the exact inference in Bayesian networks. (13)

Or

(b) Explain forward chaining and Backward Chaining for Proportional Definite Clauses. (13)

14. (a) Explain in detail about STRIPS and write the components of STRIPS for the given scenario: "Consider a flight journey in a luxurious flight from India to US". (13)

Or

(b) (i) Express your views about Rote Learning. (7)

(ii) How would you express Formal learning theory? (6)

15. (a) Illustrate in detail about the expert system shells. (13)

Or

(b) Explain in detail about General Learning Model. (13)

PART C — (1 × 15 = 15 marks)

16. (a) Consider the problem of changing a flat tire. The goal is to have a good spare tire properly mounted onto the car's axle, where the initial state has a flat tire on the axle and a good spare tire in the trunk. To keep it simple, our version of the problem is an abstract one, with no sticky lug nuts or other complications. There are just four actions: removing the spare from the trunk, removing the flat tire from the axle, putting the spare on the axle and leaving the car unattended overnight. Write the STRIPS and find out the solution.

Or

(b) Construct a Bayesian network and define the necessary CPTs for the given scenario We have a bag of three biased coins a, b, and c with probabilities of coming up heads of 20%, 60%, and 80%, respectively. One coin is drawn randomly from the bag (with equal likelihood of drawing each of the three coins) and then the coin is flipped three times to generate the outcomes X1, X2 and X3.

Reg. No. : | | | | | | | | | | | | |

Question Paper Code : 91407

B.E./B.Tech. DEGREE EXAMINATIONS, NOVEMBER/DECEMBER 2019

Fifth/Sixth Semester

Computer Science and Engineering

CS 6659 – ARTIFICIAL INTELLIGENCE

(Common to Electronics and Instrumentation Engineering/Instrumentation and Control Engineering/Information Technology)

(Regulations 2013)

(Also Common to PTCS 6659 – Artificial Intelligence for B.E. (Part-Time) – Fifth Semester – (Regulations – 2014))

Time : Three Hours | Maximum : 100 Marks

Answer ALL questions

PART – A (10×2=20 Marks)

1. What is Artificial Intelligence ?
2. Compare program with pattern matching.
3. Differentiate propositional and predicate logic.
4. What is refutation principle ?
5. Define forward chaining.
6. What is Baye's theorem ?
7. What is planning ?
8. What do you understand by the term "K-strips" ?
9. Enumerate the features of DART expert system.
10. What are the components of an expert system ?

PART – B (5×13=65 Marks)

11. a) Describe the following Hill Climbing procedures
    i) Simple hill climbing. (6)
    ii) Simulated annealing. (7)

(OR)

b) Illustrate constraint satisfaction problem to solve a cryptarithmatic problem.

12. a) Discuss alpha-beta pruning with suitable examples.

(OR)

b) Consider the following facts.

- Any boy or girl is a child.
- Any child gets a toy or a candy or a stick.
- No boy gets any toy.
- No child who is good gets a stick.
- If no child gets a candy, then no boy is good.

i) Translate the above facts to wff. (5)

ii) Convert the wff to clause form representation. (8)

13. a) Construct a comparison between production based system and frame based system.

(OR)

b) i) Explain Dempster-Shafer theory with examples. (6)

ii) Give a brief outline on Bayesian network with an example. (7)

14. a) Analyze the search strategy used in STRIPS with examples.

(OR)

b) What is Adaptive learning ? Illustrate with suitable examples.

15. a) Construct an outline on MYCIN.

(OR)

b) i) What is knowledge acquisition ? Discuss. (6)

ii) Write a brief summary on expert system shells. (7)

PART – C **(1×15=15 Marks)**

16. a) What is machine learning ? Construct a creative discussion to relate machine learning vs. artificial intelligence.

(OR)

b) Compile a case study of a knowledge based expert system for selecting a course in University.

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Reg. No. : | | | | | | | | | | | | |

Question Paper Code : 71688

B.E./B.Tech. DEGREE EXAMINATION, APRIL/MAY 2017.

Sixth Semester

Computer Science and Engineering

CS 6659 — ARTIFICIAL INTELLIGENCE

(Common to Electronics and Instrumentation Engineering, Instrumentation and Control Engineering, Information Technology)

(Regulations 2013)

Time : Three hours Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. List down the characteristics of intelligent agent.
2. List some of the uninformed search techniques.
3. Differentiate prepositional logic and predicate logic.
4. Define forward and backward chaining. Differentiate the same.
5. Define meta rules.
6. Give the Baye's rule equation.
7. What are the differences and similarities between problem solving and planning?
8. What are the different types of planning?
9. List out the problem areas addressed by expert systems.
10. What are the advantages of the MYCIN?

PART B — (5 × 16 = 80 marks)

11. (a) Explain informed search strategies with an example. (16)

Or

(b) Explain the process of simulated annealing with example. (16)

12. (a) Explain Minimax algorithm in detail. (16)

Or

(b) Explain Alpha-Beta Pruning and Alpha-Beta algorithm. (16)

13. (a) Explain in detail about forward and backward chaining with an example. (16)

Or

(b) Explain about Dempster shafer theory. (16)

14. (a) Discuss in detail the process of machine learning with example. (16)

Or

(b) Explain in detail the STRIPS. (16)

15. (a) Define Expert System. Explain the architecture of an expert system in detail with a neat diagram and an example. (16)

Or

(b) Explain the need, significance and evolution of XCON expert system. (16)

Reg. No. : | | | | | | | | | | | | |

Question Paper Code : 40915

B.E./B.Tech. DEGREE EXAMINATION, APRIL /MAY 2018
Fifth/Sixth Semester
Computer Science and Engineering
CS 6659 – ARTIFICIAL INTELLIGENCE
(Common to Electronics and Instrumentation Engineering, Instrumentation and Control Engineering, Information Technology)
(Regulations 2013)

Time : Three Hours | Maximum : 100 Marks

Answer ALL questions

PART – A (10×2=20 Marks)

1. Will Breadth-First Search always find the minimal solution. Why ?
2. What is a monotonic production system ?
3. Write the following in a predicate logic : For all x and y, if x is a parent of y then y is a child of x.
4. List any three methods to select an initial structure knowledge representation.
5. Given that P (A) = 0.3, P (A | B) = 0.4 and P (B) = 0.5, compute P (B | A).
6. How does forward chaining differs from backward chaining ?
7. Define machine learning.
8. When is a *why explanation* better than a *how explanation* ?
9. What are the common mechanisms supported in an expert system shell ?
10. List the three activities supported by the programs that interact with domain experts to extract expert knowledge.

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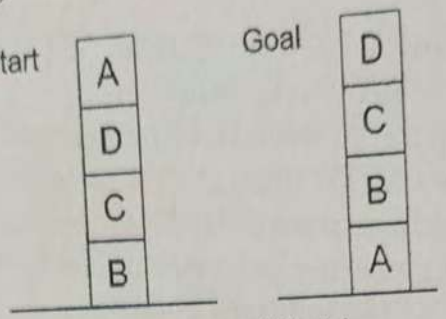
(5×13=65 Marks)

PART – B

11. a) Consider the Blocks World problem with four blocks A, B, C and D with the start and goal states given below.



Blocks World

Assume the following two operations : Pick and a block and put it on table, pick up a block and put it on another block. Solve the above problem using Hill Climbing algorithm and a suitable heuristic function. Show the intermediate decisions and states.

(OR)

b) List and describe the problem characteristics that need to be considered for selecting appropriate heuristics for a given class of problems.

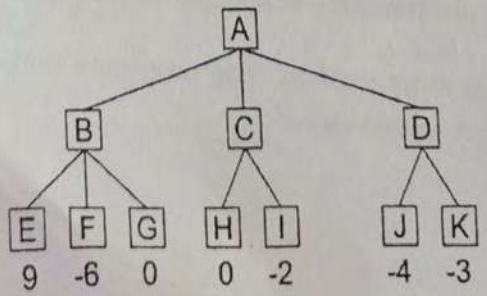
12. a) Consider the following facts :

- Steve only likes easy courses.
- Science courses are hard.
- All the courses in the HaveFun department are easy.
- BK301 is a HaveFun department course.

Use resolution to answer the question "What course would Steve like " ?

(OR)

b) Consider a two player game in which the minimax search procedure is used to compute the best moves for the first player. Assume a static evaluation function that returns values ranging from – 10 to 10, with 10 indicating a win for the first player and –10 a win for the second player. Assume the following game tree in which the static scores are from the first player's point of view. Suppose the first player is the maximizing player and needs to make the next move. What move should be chosen at this point ? Can the search be optimized ?



13. a) Discuss the need and structure of Bayesian networks.

(OR)

b) How are frames used in knowledge representation ? Give the structure of a general frame.

14. a) Discuss planning methodology used by STRIPS in detail.

(OR)

b) Discuss the various types of machine learning with appropriate examples.

15. a) Write a detailed note about the MYCIN expert system and its functioning.

(OR)

b) Write a detailed note on expert systems including representation, usage of domain knowledge, reasoning and explaining.

PART – C **(1×15=15 Marks)**

16. a) Suppose the police is informed that one of the four terrorist organizations A, B, C or D has planted a bomb in a building. Draw the lattice of subsets of the universe of discourse, U. Assume that one evidence supports that groups A and C were responsible to a degree of m_1 ({A, C}) = 0.6 and another evidence supports the belief that groups A, B and D were involved to a degree m_2 = ({A, B, D}) = 0.7. Compute and create the tableau of combined values of belief for m_1 and m_2.

(OR)

b) Consider the cryptarithmetic problem shown below. The goal is a problem state where all letters have been assigned a digit in such a way that all the initial constraints are satisfied.

Problem :

$$\begin{array}{r} S\ E\ N\ D \\ +\ M\ O\ R\ E \\ \hline M\ O\ N\ E\ Y \end{array}$$

Initial State constraints :

- No two letters have the same value
- The sums of the digits must be as shown in the problem

Explain steps in detail to solve this problem using the constraint satisfaction algorithm.

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Reg. No. : | | | | | | | | | | | | |

Question Paper Code : 52872

B.E./B.Tech. DEGREE EXAMINATION, APRIL/MAY 2019.

Fifth/Sixth Semester

Computer Science and Engineering

CS 6659 — ARTIFICIAL INTELLIGENCE

(Common to Electronics and Instrumentation Engineering/Instrumentation and Control Engineering/Information Technology)

(Regulation 2013)

(Also Common to PTCS 6659 – Artificial Intelligence for B.E. (Part-Time) Computer Science and Engineering – Fifth Semester – Regulations – 2014)

Time : Three hours Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. List down the characteristics of Production system.
2. What are the performance measures used for analysing the search algorithms?
3. Distinguish between predicate logic and propositional logic.
4. Represent the following in Semantic Net, "All students like the subject AI".
5. List down the issues in Bayes theorem to deal with uncertain reasoning systems.
6. Define Fuzzification.
7. Distinguish between continuous planning and conditional planning.
8. List down the various Machine learning techniques.
9. List down the characteristics of Expert System.
10. What is the need of an Expert system Shell?

PART B — (5 × 13 = 65 marks)

11. (a) (i) Analyse the following problems with respect to the seven problem characteristics :

(1) Travelling salesman problem

(2) 8-puzzle problem

(3) Towers of Hanoi

(4) Chess. (8)

(ii) Explain Best First search algorithm with an example. (5)

Or

(b) (i) Explain the constraint satisfaction procedure to solve the cryptarithmetic problem.

```
  CROSS
+ ROADS
--------
 DANGER
```

(7)

(ii) Explain AO^* algorithm with an example. (6)

12. (a) (i) Explain the Min Max game playing algorithm with an example. (6)

(ii) Consider the following facts

(1) All students in 4th year are intelligent

(2) Raja is a 4th year student

(3) Ragu is a 3rd year student

(4) 3rd year students are not intelligent

(5) 4th year students have no friends in 3rd year

Represent the facts in predicate, convert to clause form and prove by resolution, "Raja is not friend of Ragu". (7)

Or

(b) (i) Explain the unification algorithm with an example. (6)

(ii) Consider the following facts

(1) There are 5000 employees in XYZ company

(2) Employees earning more than Rs.25000/ annum pay tax

(3) John is a manager in XYZ company

(4) Manager earns Rs.50,000

Represent the facts in predicate, convert to clause form and prove by resolution ,"John pays tax". (7)

13. (a) (i) Explain Dempster Shafer theory with an example. (6)

(ii) How is reasoning done in Bayesian network? (7)

Or

(b) (i) Explain the concept of knowledge representation using Frame based system. (6)

(ii) What are fuzzy membership functions? Explain them with examples. (7)

14. (a) (i) Distinguish between STRIPS and ADL. (5)

(ii) Explain the concept of learning using neural networks with an example. (8)

Or

(b) (i) Explain the concept of learning by parameter adjustment and learning by Macro operators. (8)

(ii) Explain the concept of learning using genetic algorithm (5)

15. (a) Explain the architecture of an expert system with a block diagram.

Or

(b) Explain on the design principles involved in the following Expert systems.

(i) MYCIN

(ii) DART

PART C — (1 × 15 = 15 marks)

16. (a) (i) Design a fuzzy washing machine that can decide the speed of its motor based on dirt level (low medium, high, large), cloth type (cotton, wool, silk, blankets) and cloth weight (min, med, max). Design the table to specify the membership value related to each fuzzy term. Fix the speed of motor as 10 rpm, 20 rpm and 30 rpm. Derive rules for fixing motor speed. (10)

(ii) Show how JTMS could be used in medical diagnosis. Consider the rules such as, "If you have a runny nose assume you have cold unless it is allergy season". (5)

Or

(b) (i) A diagnostic test has a probability 0.95 of giving a positive result when applied to a person suffering from a certain disease, and a probability 0.10 of giving a (false) positive when applied to a non-sufferer. It is estimated that 0.5 % of the population are sufferers. Suppose that the test is now administered to a person about whom we have no relevant information relating to the disease (apart from the fact that he/she comes from this population). Calculate the following probabilities:

(1) that the test result will be positive;

(2) that, given a positive result, the person is a sufferer;

(3) that, given a negative result, the person is a non-sufferer;

(4) that the person will be misclassified. (8)

(ii) You have 12 litres of apple juice in a 12 litres bucket and you want share it with your best friend. But you have all empty 8-litre and an empty 5-litre bottle. Design the production system for it. (7)

Reg. No. : | | | | | | | | | | | | |

Question Paper Code : 41285

B.E./B.Tech. DEGREE EXAMINATION, APRIL/MAY 2018
Sixth/Seventh Semester
IT6004 – SOFTWARE TESTING
Common to : B.E. Computer Science and Engineering/B.Tech. Information Technology
(Regulations 2013)

Time : Three Hours | Maximum : 100 Marks

Answer ALL questions

PART – A (10×2=20 Marks)

1. List out the levels of the testing maturity model.
2. Define Test Oracle.
3. What are the factors affecting less than 100% degree of coverage ?
4. Write the formula for cyclomatic complexity.
5. What is the advantage of Bottom up integration ?
6. Give the examples of security testing.
7. Define a Work Breakdown Structure (WBS).
8. What is the function of Test Item Transmittal Report or Locating Test Items ?
9. What are the goals of Reviewers ?
10. What is Walk Through ?

PART – B (5×13=65 Marks)

11. a) Give overview of the Testing Maturity Model (TMM) and the test related activities that should be done for V-model architecture. (13)

(OR)

b) Elaborate on the principles of software testing and summarize the tester role in software development organization. (13)

12. a) Demonstrate the various black box test cases using equivalence class partitioning and boundary value analysis to test a module for payroll system. (13)

(OR)

b) Explain about state transition testing. (13)

13. a) i) Write the importance of security testing and explain the consequences of security breaches, also write the various areas which has to be focused on during security testing. (7)

ii) State the need for integration testing in procedural code. (6)

(OR)

b) i) Explain about the unit test planning. (7)

ii) Explain about configuration testing and its objectives. (6)

14. a) Explain the components of test plan in detail. (13)

(OR)

b) i) List and explain the skills needed by a test specialist. (7)

ii) Name the reports of test results and the contents available in each test reports. (6)

15. a) Discuss the types of review. Explain various components of review plans. (13)

(OR)

b) Narrate about the metrics or parameters to be considered for evaluating the software quality. (13)

PART – C (1×15=15 Marks)

16. a) Explain in detail processing and monitoring of the defects with defect repository.

(OR)

b) Explain the organizational structures for testing teams in single product companies.

Reg. No. :

Question Paper Code : 91760

B.E./B.Tech. DEGREE EXAMINATIONS, NOVEMBER/DECEMBER 2019

Sixth/Seventh Semester

Computer Science and Engineering

IT 6004 – SOFTWARE TESTING

(Common to Information Technology)

(Regulations 2013)

(Also Common to PTIT6004 – Software Testing for B.E. (Part-Time) – Sixth Semester Computer Science and Engineering – Regulations 2014)

Time : Three Hours | Maximum : 100 Marks

Answer ALL questions

PART – A (10×2=20 Marks)

1. Mention the role of process in Software Quality.
2. Mention the various sources of defects.
3. What is Error, Defect, Bug and Failure ?
4. What are the components of COTS ?
5. Compare Black box testing and White box testing.
6. Why it is important to design test harness for testing ?
7. What are the issues in testing Object Orient Systems ?
8. List the skills needed by a test specialist.
9. What are the challenges in test automation ?
10. Define progress metrics and process metrics.

PART – B (5×13=65 Marks)

11. a) Elaborate the software testing principles and summarize the tester role in software development organization.

(OR)

b) Explain Testing Maturity Model (TMM) and the test related activities that should be done for V-Model Architecture.

12. a) Discuss in detail about static testing and structural testing. Write the difference between these two testing concepts.

(OR)

b) Explain about the various black box test cases using equivalence class partitioning and boundary value analysis to test a module.

13. a) Explain briefly about the various types of system testing.

(OR)

b) Explain about the :

i) Unit test planning (7)

ii) Configuration testing and its objectives. (6)

14. a) i) Discuss in detail about various skills needed for a test specialist. (7)

ii) Write about Mutation Testing with an example. (6)

(OR)

b) Explain the components of test plan in detail.

15. a) Discuss the design and architecture for automation with neat sketch.

(OR)

b) Write short notes on :

i) Classification of automation testing.

ii) Scope of automation.

PART – C

(1×15=15 Marks)

16. a) Explain the importance of security testing and explain the consequences of security breaches, also write the various areas which has to be focused during security testing.

(OR)

b) Explain in detail processing and monitoring of the defects with defect repository.

Reg. No. : | | | | | | | | | | | | |

Question Paper Code : 50399

B.E./B.Tech. DEGREE EXAMINATION, NOVEMBER/DECEMBER 2017
Seventh/Eighth Semester
Computer Science and Engineering
CS 6701 – CRYPTOGRAPHY AND NETWORK SECURITY
(Common to Electronics and Communication Engineering/Information Technology)
(Regulations 2013)

Time : Three Hours | Maximum : 100 Marks

Answer ALL questions.

PART – A (10×2=20 Marks)

1. Categorize Passive and Active attack.
2. State Fermat's Theorem.
3. Perform encryption for the plain text M = 88 using the RSA Algorithm p = 17, q = 11 and the public component e = 7.
4. Give the significance of hierarchical key control.
5. How is the security of a MAC function expressed ?
6. Mention the significance of signature function in Digital Signature Standard (DSS) approach.
7. Write a simple authentication dialogue used in Kerberos.
8. List any 2 applications of X.509 Certificates.
9. Specify the purpose of ID Payload in Phase I and Phase II inherent in ISAKMP/ IKE encoding.
10. Justify the following statement :

"With a Network Address Translation (NAT) box, the computers on your internal network do not need global IPV4 addresses in order to connect to the Internet".

(5×16=80 Marks)

PART – B

11. a) Encrypt the following using play fair cipher using the keyword MONARCHY. "SWARAJ IS MY BIRTH RIGHT". Use X for blank spaces.

(OR)

b) Discuss the properties that are to be satisfied by Groups, Rings and Fields.

12. a) Users Alice and Bob use the Diffie-Hellman key exchange technique with a common prime $q = 83$ and a primitive root $\alpha = 5$.
i) If Alice has a private key $X_A = 6$, what is Alice's public key Y_A? (6)
ii) If Bob has a private key $X_B = 10$, what is Bob's public key Y_B? (6)
iii) What is the shared secret key ? (4)

(OR)

b) For each of the following elements of DES, indicate the comparable element in AES if available.
i) XOR of subkey material with the input to the function. (4)
ii) f function. (4)
iii) Permutation p. (4)
iv) Swapping of halves of the block. (4)

13. a) Write down the steps involved in
i) Elgamal Digital Signature Scheme. (8)
ii) Schnorr Digital Signature Scheme. (8)
used for authenticating a person.

(OR)

b) With a neat diagram, explain the steps involved in SHA algorithm for encrypting a message with maximum length of less than 2^{128} bits and produces as output a 512-bit message digest.

14. a) Explain how secure electronic transaction (SET) protocol enables e-transactions in details. Explain the components involved.

(OR)

b) Discuss how firewalls help in the establishing a security framework for an organization.

15. a) i) Discuss the different methods involved in authentication of the source. (8
ii) Write about how the integrity of message is ensured without source authentication. (8

(OR)

b) i) Write the steps involved in the simplified form of the SSL/TLS protocol. (8
ii) Write the methodology involved in computing the keys in SSL/TLS protocol. (8

Reg. No. : | | | | | | | | | | | | |

Question Paper Code : 20375

B.E./B.Tech. DEGREE EXAMINATION, NOVEMBER/DECEMBER 2018.

Seventh/Eighth Semester

Computer Science and Engineering

CS 6701 — CRYPTOGPAPHY AND NETWORK SECURITY

(Regulations 2013)

(Common to Electronics and Communication Engineering, Information Technology)

(Also common to PTCS 6701 – Cryptography and Network Security for B.E. (Part-Time) – Sixth Semester – Computer Science and Engineering – Regulations 2014)

Time : Three hours Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. Distinguish between attack and threat.
2. Calculate the cipher text for the following using one time pad cipher.
   Plain Text: ROCK & Keyword: BOTS
3. Compare DES and AES.
4. Why is trap door one way function used?
5. Define the term message digest.
6. Contrast various SHA algorithms.
7. List various types of firewall.
8. Discriminate statistical anomaly detection and rule based detection.
9. What are the services provided by PGP?
10. Differentiate transport and tunnel mode in IPSec.

PART B — (5 × 13 = 65 marks)

11. (a) Solve gcd (98, 56) using Extended Euclidean algorithm. Write the algorithm also.

Or

(b) Perform Encryption and decryption using Hill Cipher for the following.
Message PEN and Key: ACTIVATED.

12. (a) Perform encryption and decryption using RSA algorithm for p = 17, q = 11, e = 7 and M = 88.

Or

(b) Find the secret key shared between user A and user B using Diffie Hellman algorithm for the following.

q = 353; α (primitive root) = 3, X_A = 45 and X_B = 50

13. (a) Illustrate SHA2 in detail.

Or

(b) Explain Elgamal digital signature scheme.

14. (a) Analyze various types of virus and its counter measures.

Or

(b) Illustrate the working principle of SET. Relate SET for E-commerce applications.

15. (a) Explain in detail about S/MIME.

Or

(b) Describe in detail about SSL/TLS.

PART C — (1 × 15 = 15 marks)

16. (a) Why ECC is better than RSA? However, why is it not widely used? Defend it.

Or

(b) Evaluate the performance of PGP. Compare it with S/MIME.

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Question Paper Code : 91409

B.E./B.Tech. DEGREE EXAMINATIONS, NOVEMBER/DECEMBER 2019

Seventh/Eighth Semester

Computer Science and Engineering

CS6701 – CRYPTOGRAPHY AND NETWORK SECURITY

(Common to Electronics and Communication Engineering/Information Technology)

(Regulations 2013)

(Also common to PTCS6701 – Cryptography and Network Security for B.E. Part-time – Sixth Semester – Computer Science and Engineering – Regulations 2014)

Time : Three Hours | Maximum : 100 Marks

Answer ALL questions

PART – A (10×2=20 Marks)

1. Define Field and Ring in number theory.
2. Consider the RSA encryption method with p = 11 and q = 17 as the two primes. Find n and ϕ (n).
3. Does the set of residue classes (Mod3) form a group
   a) With respect to modular addition ?
   b) With respect to modular multiplication ?
4. List the entities that are to be kept secret in conventional encryption techniques.
5. State the requirements of a digital signature.

6. Compare direct and arbitrated digital signature.

7. What is realm in Kerberos ?

8. List the five principal services provided by PGP.

9. In SSL and TLS, why is there a separate change_cipher_spec protocol rather than including a change_cipher_spec message in the Handshake Protocol ?

10. What entities constitute a full service in Kerberos environment ?

PART – B (5×13=65 Marks)

11. a) i) Explain in detail about the entities in the symmetric cipher model with their requirements for secure usage of the model. (6)

ii) Demonstrate that the set of polynomials whose coefficients form a field is a ring. (7)

(OR)

b) Write a note on different types of security attacks and services in detail. (13)

12. a) Explain Diffie Hellman Key exchange algorithm in detail. (13)

(OR)

b) Explain the working of RSA and choose an application of your choice for RSA and show how encryption and decryption is carried out. (13)

13. a) i) Compare the uses of MAC and Hash function. Represent them using appropriate diagrams. (8)

ii) List down the advantages of MD5 and SHA algorithms. (5)

(OR)

b) List the design objectives of HMAC and explain the algorithm in detail. (13)

14. a) Discuss about the components involved in e-transactions using secure electronic transaction protocol. Specify how it ensures the security during transactions. (13)

(OR)

b) Explain in detail about the types of firewalls and mention the design criteria of a firewall to protect the host machines in an educational institution. (13)

15. a) Using the PGP cryptographic functions, explain the security features offered for e-mails in detail. (13)

(OR)

b) Discuss in detail about IP security architecture and the services offered by IPSec. (13)

PART – C (1×15=15 Marks)

16. a) Consider a banking application that is expected to provide cryptographic functionalities. Assume that this application is running on top of another application wherein the end customers can perform a single task of fund transfer. The application requires cryptographic requirements based on the amount of transfer.

Transfer amount	Cryptography functions required
1 – 2000	Message digest
2001 – 5000	Digital signature
5000 and above	Digital signature and encryption

Suggest the security scheme to be adopted in client and server side to accommodate the above requirements and justify your recommendations. (15)

(OR)

b) Suggest and explain about an authentication scheme for mutual authentication between the user and the server which relies on symmetric encryption. (15)

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Question Paper Code : 71690

B.E./B.Tech. DEGREE EXAMINATION, APRIL/MAY 2017.

Seventh/Eighth Semester

Computer Science and Engineering

CS 6701 — CRYPTOGRAPHY AND NETWORK SECURITY

(Common to Electronics and Communication Engineering and Information Technology)

(Regulations 2013)

Time : Three hours Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. State Fermat's theorem.
2. Determine the gcd (24140, 16762) using Euclid's algorithm.
3. State the difference between private key and public key algorithm.
4. Give the five modes of operation of block cipher.
5. What is the role of compression function in hash function?
6. Specify the various types of authentication protocol.
7. Define the roles of firewalls.
8. State the difference between threats and attacks.
9. Draw the ESP packet format.
10. Specify the benefits of IPSec.

PART B — (5 × 16 = 80 marks)

11. (a) State Chinese Remainder theorem and find X for the given set of congruent equations using CRT (16)

$X \equiv 1 \pmod 5$

$X \equiv 2 \pmod 7$

$X \equiv 3 \pmod 9$

$X \equiv 4 \pmod{11}$

Or

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Question Paper Code : 40917

B.E./B.Tech. DEGREE EXAMINATION, APRIL/MAY 2018
Seventh/Eighth Semester
Computer Science and Engineering
CS6701 – CRYPTOGRAPHY AND NETWORK SECURITY
(Common to Electronics and Communication Engineering/Information Technology)
(Regulations 2013)

Time : Three Hours | Maximum : 100 Marks

Answer ALL questions

PART – A **(10×2=20 Marks)**

1. Why is asymmetric cryptography bad for huge data ? Specify the reason.
2. State Euler's theorem.
3. List the parameters (block size, key size, and no. of rounds) for the three AES versions.
4. Perform encryption and decryption using RSA Algorithm for the following. P = 7; q = 11; e = 17; M = 8.
5. What is a hash in cryptography ?
6. How digital signatures differs from authentication protocols ?
7. What is the main function of a firewall ?
8. What is a Threat ? List their types.
9. List out the services provided by PGP.
10. What is the difference between TLS and SSL security ?

PART – B **(5×16=80 Marks)**

11. a) Explain classical encryption techniques with symmetric cipher and Hill cipher model.

(OR)

b) State and prove the Chinese remainder theorem. What are the last two digits of 49^{19} ?

12. a) What do you mean by AES ? Diagrammatically illustrate the structure of AES and describe the steps in AES encryption process with example.

(OR)

b) With a neat sketch explain the Elliptic curve cryptography with an example.

13. a) How Hash function algorithm is designed ? Explain their features and properties.

(OR)

b) With a neat diagram, explain the MD5 processing of a single 512 bit block.

14. a) Explain briefly about the architecture and certification mechanisms in Kerberos and X.509.

(OR)

b) How does screened host architecture for firewalls differ from screened subnet firewall architecture ? Which offers more security for information assets on trusted network ? Explain with neat sketch.

15. a) Illustrate how PGP encryption is implemented through a suitable diagram.

(OR)

b) Write short notes on the following :

a) Public Key Infrastructure (8)

b) Secure Electronic Transaction (8)

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Question Paper Code : 52874

B.E./B.Tech. DEGREE EXAMINATIONS, APRIL/MAY 2019.

Seventh/Eighth Semester

Computer Science and Engineering

CS 6701 — CRYPTOGRAPHY AND NETWORK SECURITY

(Common to Electronics and Communication Engineering/Information Technology)

(Regulation 2013)

(Also common to PTCS 6701 — Cryptography and Network Security for B.E. (Part-Time) — Sixth Semester – Computer Science and Engineering – Regulation 2014))

Time : Three hours

Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. Differentiate active and passive attacks.

2. Specify the components of encryption algorithm.

3. Give the applications of the public key cryptosystem.

4. What are primitive operations used in RC5?

5. What are the requirements for message authentication?

6. Show how SHA is more secure than MD5.

7. List the design goals of firewalls.

8. List the three classes of intruders.

9. Mention the five header fields defined in MIME.

10. What are the benefits of IP Security?

PART B — ($5 \times 13 = 65$ marks)

11. (a) (i) What is steganography? Describe the various techniques used in steganography. (7)

(ii) What is monoalphabetic cipher? Examine how it differs from Caesar cipher. (6)

Or

(b) Explain the network security model and its important parameters with a neat block diagram.

12. (a) (i) Describe in detail the key generation in AES algorithm and its expansion format. (7)

(ii) Describe triple DES and its applications. (6)

Or

(b) (i) Describe RSA algorithm. (8)

(ii) Perform encryption and decryption using RSA algorithm for the following : $p = 7$, $q = 11$, $e = 7$, $M = 9$. (5)

13. (a) Describe digital signature algorithm and show how signing and verification is done using DSS.

Or

(b) Describe the MD5 message digest algorithm with necessary block diagrams.

14. (a) (i) What is Kerberos? Explain how it provides authenticated service. (7)

(ii) Explain the format of the X.509 certificate. (6)

Or

(b) Explain the various types of firewalls with neat diagrams.

15. (a) Explain PGP cryptographic functions in detail with suitable block diagrams.

Or

(b) Explain the architecture of IPsec in detail with a neat block diagram.

PART C — (1 × 15 = 15 marks)

16. (a) (i) Explain briefly about Diffie Hellman key exchange algorithm with its merits and demerits. (10)

(ii) Explain public key cryptography and when it is preferred? (5)

Or

(b) Solve using playfair cipher method. Encrypt the word "Semester Result" with the keyword "Examination". Discuss the roles to be followed.

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Question Paper Code : 50402

B.E./B.Tech. DEGREE EXAMINATION, NOVEMBER/DECEMBER 2017

Seventh Semester

Computer Science and Engineering

CS6704 – RESOURCE MANAGEMENT TECHNIQUES

(Regulations 2013)

Time : Three Hours | Maximum : 100 Marks

Answer ALL questions

PART – A (10×2=20 Marks)

1. What is Feasible Region in a LPP ?
2. What is Sensitivity Analysis ?
3. What is Dual Problem in LPP ?
4. What is Dual Simplex Method ?
5. What do you understand by Cutting Plane Algorithm ?
6. What is Dynamic Programming ?
7. What is CPM ?
8. Write about PERT.
9. What do you mean by Transportation Problem ?
10. What do you understand by Assignment Problem ?

PART – B (5×16=80 Marks)

11. a) A manufacturer makes two components, T and A, in a factory that is divided into two shops. Shop I, which performs the basic assembly operation, must work 5 man-days on each component T but only 2 man-days on each component A. Shop II, which performs finishing operation, must work 3 man-days for each of component T and A it produces. Because of men and machine limitations, Shop I has 180 man-days per week available, while Shop II has 135 man-days per week.

If the manufacturer makes a profit of Rs. 300 on each component T and Rs. 200 on each component A, how many of each should be produced to maximize his profit. Use simplex method.

(OR)

b) Explain the types of Models. Also explain the characteristics of a good model along with the principles involved in modeling.

12. a) Use dual simplex method to solve the following LPP :

$$\text{Maximize } Z = -3X_1 - 2X_2$$

Subject to $X_1 + X_2 \geq 1$

$X_1 + X_2 \leq 7$

$X_1 + 2X_2 \geq 10$

$X_2 \leq 3$

and $X_1, X_2 \geq 0$

(OR)

b) Elucidate the procedure for formulating a linear programming problems. Explain the advantages and limitations of linear programming.

13. a) Obtain an optimum basic feasible solution to the following transportation problem :

		To		Available
	7	3	2	2
From	2	1	3	3
	3	4	6	5
Demand	4	1	5	10

(OR)

b) Solve the following assignment problem for maximization given the profit matrix (profit in rupees) :

		Machines			
		P	Q	R	S
	A	51	53	54	50
Job	B	47	50	48	50
	C	49	50	60	61
	D	63	64	60	60

14. a) Solve the following LPP using dynamic programming approach :

$$\text{Max } Z = 3X_1 + 5X_2$$

subject to $X_1 \leq 4$

$X_2 \leq 6$

$3X_1 + 2X_2 \leq 18$

and $X_1, X_2 \geq 0$

(OR)

b) Use Branch and Bound method to solve the following :

$$\text{Maximize } Z = 2X_1 + 2X_2$$

Subject to $5X_1 + 3X_2 \leq 8$

$X_1 + 2X_2 \leq 4$

and $X_1, X_2 \geq 0$ and integer.

15. a) The following table indicates the details of a project. The duration are in days . "a" refers to optimistic time, "m" refers to most likely time and "b" refers to pessimistic time duration.

Activity	1 – 2	1 – 3	1 – 4	2 – 4	2 – 5	3 – 4	4 – 5
a	2	3	4	8	6	2	2
m	4	4	5	9	8	3	5
b	5	6	6	11	12	4	7

i) Draw the net work.

ii) Find the critical path.

iii) Determine the expected standard deviation of the completion time.

(OR)

b) Explain the following :

i) Difference between PERT and CPM

ii) Lagrangian method and Khun-Tucker conditions.

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Question Paper Code : 20378

B.E./B.Tech. DEGREE EXAMINATION, NOVEMBER/DECEMBER 2018.

Seventh Semester

Computer Science and Engineering

CS 6704 — RESOURCE MANAGEMENT TECHNIQUES

(Regulations 2013)

Time : Three hours Maximum : 100 marks

Std. Statistics table permitted.

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. What is linear programming?
2. What do you mean by optimal solution of LPP?
3. Define duality problem in Operation Research.
4. Bring out the difference between assignment and transportation problem.
5. What is cutting plane method?
6. What do you understand by dynamic Programming?
7. What is Newton–Raphson method?
8. What is Tucker Condition? And bring out its application.
9. Bring out any four difference between CPM and PERT.
10. List out the advantages of PERT.

PART B — (5 × 13 = 65 marks)

11. (a) (i) Discuss the steps involved in the formulation of LP Problem.

(ii) Maximise $Z = 0.75a + 1b$

Subject to :

$1a + 1b \geq 0$

$-0.5a + 1b \leq 1$ and both a and b are ≥ 0.

Solve this using Graphical Method.

Or

(b) Solve using Simplex Method.

Maximize $z = 3x_1 + 2x_2$

Subject to :

$-x_1 + 2x_2 \leq 4$

$3x_1 + 2x_2 \leq 14$

$x_1 - x_2 \leq 14$

$x_1 - x_2 \leq 3$, where $x_1, x_2 \geq 0$.

12. (a) Solve the following linear programming problem using dual simplex method.

Min. $z = 2x_1 + x_2$

Subject to :

$3x_1 + x_2 \geq 3$

$4x_1 + 3x_2 \geq 6$

$x_1 + 2x_2 \leq 3$

$x_i \geq 0$.

Or

(b) Four captain pilots (CP1, CP2, CP3, CP4) has evaluated four flight officers (FO1, FO2, FO3, FO4) according to perfection, adaptation, morale motivation in a 1-20 scale (1: very good, 20: very bad). Evaluation grades are given in the table. Flight Company wants to assign each flight officer to a captain pilot according to these evaluations. Determine possible flight crews.

	FO1	FO2	FO3	FO4
CP1	2	4	6	10
CP2	2	12	6	5
CP3	7	8	3	9
CP4	14	5	8	7

13. (a) Using Branch and Bound Method.

Min. $f = 4x_1 + 5x_2$

Subject to

$x_1 + 4x_2 \geq 5$

$3x_1 + 2x_2 \geq 7$

$x_1, x_2 \geq 0$, both integer.

Or

(b) (i) Bring out the characteristics of Dynamic Programming.

(ii) A vessel is to be loaded with stocks of 3 items. Each item 'j' has a weight of w_j and a value of v_j. The maximum cargo weight the vessel can take is 5 and the details of the three items are as follows:

j	w_j	v_j
1	1	30
2	3	80
3	2	65

Develop the recursive equation for the above case and find the most valuable cargo load without exceeding the maximum cargo weight by using dynamic programming.

14. (a) Solve $ $2x^3 - 2.5x - 5 = 0$ for the root in [1, 2] by Newton Raphson method.

Or

(b) Minimize $f = x_1^2 + 2x_2^2 + 3x_3^2$

Subject to the constraints :

$g_1 = x_1 - x_2 - 2x_3 \leq 12$

$g_2 = x_1 + 2x_2 - 3x_3 \leq 8$

Using Kuhn-Tucker conditions.

15. (a) (i) What is Critical Path Method and further bring out the usefulness of it?

(ii) Draw the network diagram exactly with two dummies.

Activity	Must be proceeded by
A	–
B	–
C	B
D	A, C
E	A
F	E
G	E
H	G
I	D, F
J	G, I
K	G, I
L	H, K

Or

(b) A small project is composed of 7 activities whose time estimates are listed below. Activities are being identified by their beginning (i) and ending (j) node numbers

Activities		Time in weeks		
i	j	t_0	t_1	t_p
1	2	1	1	7
1	3	1	4	7
1	4	2	2	8
2	5	1	1	1
3	5	2	5	14
4	6	2	5	8
5	6	3	6	15

(i) Draw the network.

(ii) Calculate the expected variances for each.

(iii) Find the expected project completed time.

(iv) Calculate the probability that the project will be completed at least 3 weeks than expected.

(v) If the project due date is 18 weeks, what is the probability.

PART C — (1 × 15 = 15 marks)

16. (a) A factory manufactures two products A and B on three machines X, Y, and Z. Product A requires 10 hours of machine X and 5 hours of machine Y a one our of machine Z. The requirement of product B is 6 hours, 10 hours and 2 hours of machine X, Y and Z respectively. The profit contribution of products A and B are Rs. 23/- per unit and Rs. 32 /- per unit respectively. In the coming planning period the available capacity of machines X. Y and Z are 2500 hours, 2000 hours and 500 hours respectively. Find the optimal product mix for maximizing the profit.

Or

(b) Mr. Banerjee, a sales manager, has decided to travel from city 1 to city 10. He wants to plan for minimum distance programme and visit maximum number of branch offices as possible on the route. The route map of the various ways of reaching city 10 from city 1 is shown Fig. 16(b). The numbers on the arrow indicates the distance in km. (× 100). Suggest a feasible minimum path plan to Mr. Banerjee.

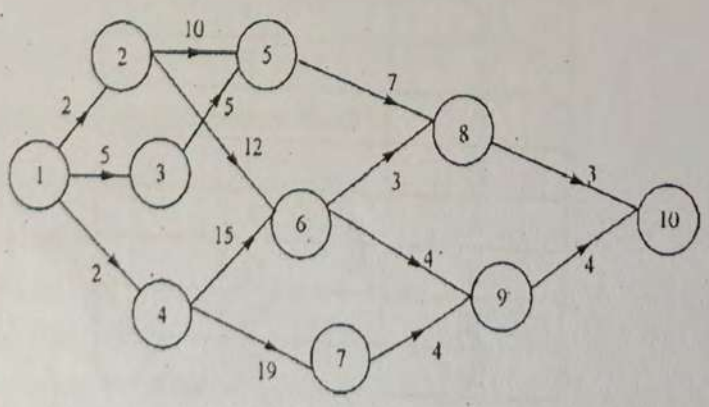

Fig. 16 (b)

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Question Paper Code : 91412

B.E./B.Tech. DEGREE EXAMINATIONS, NOVEMBER/DECEMBER 2019

Seventh Semester

Computer Science and Engineering

CS 6704 – RESOURCE MANAGEMENT TECHNIQUES

(Regulations 2013)

Time : Three Hours | Maximum : 100 Marks

Answer ALL questions

PART – A (10×2=20 Marks)

1. List the four assumptions in Linear programming.
2. Difference between Feasible and Optimal solution.
3. Describe the principal components of Decision problem.
4. A firm manufactures two types of products A and B and sells them at profit of Rs. 2 on type A and Rs. 3 on type B. Each product is processed on two machines M1 and M2. Type A requires 1 minute of processing time on M1 and 2 minutes on M2. Type B requires 1 minute of processing time on M1 and 1 minute on M2. Machine M1 is available for not more than 6 hours 40 minutes while Machine M2 is available for 10 hours during any working day. Formulate the problem as a LPP so as to maximize the profit.
5. Define primal and dual problem.
6. What do you understand by cutting plane problem ?
7. Examine $f(x) = 6x^5 - 4x^3 + 10$ for extreme points.
8. What is Newton-Raphson Method ?
9. Write short notes on Time charts and resource levelling.
10. Bring out any four difference between PERT and CPM.

PART – B (5×13=65 Marks)

11. a) List out the graphical method procedure to solve simple linear programming problems of two decision variables.

(OR)

b) Write short notes on the following :

i) Alternate optimum solution. (3)

ii) Unbounded solution. (5)

iii) Infeasible solution. (5)

12. a) Use dual Simplex method to solve the LPP.

Maximize $Z = -3x_1 - 2x_2$

Subject to $x_1 + x_2 \geq 1$

$x_1 + x_2 \leq 7$

$x_1 + 2x_2 \geq 10$

and $x_1, x_2 \geq 0$

(OR)

b) Consider the problem of assigning four sales persons to four different sales regions as shown in the following table such that the total sales is maximized.

Sales man	Sales Region 1	2	3	4
1	10	22	12	14
2	16	18	22	10
3	24	20	12	18
4	16	14	24	20

The cell entries represent annual sales figures in lakhs of rupees. Find the optional allocation of the sales persons to different regions.

13. a) Solve the following LPP using dynamic programming approach :

Maximize $Z = 3x_1 + 5x_2$

Subject to $x_1 \leq 4$

$x_2 \leq 6$

$3x_1 + 2x_2 \leq 18$

and $x_1, x_2 \geq 0$

(OR)

b) Use Branch and Bound method to solve the following :

Maximize $Z = 2x_1 + 2x_2$

Subject to $5x_1 + 3x_2 \leq 8$

$x_1 + 2x_2 \leq 4$

and $x_1, x_2 \geq 0$ and integer.

14. a) Using Jacobian method Max $Z = 2x_1 + 3x_2$

Subject to $x_1 + x_2 + x_3 = 5$

$x_1 + x_2 + x_4 = 3$

and $x_1, x_2, x_3, x_4 \geq 0$

(OR)

b) Solve the nonlinear programming by Lagrangian multiplier method.

Minimize $Z = x_1^2 + 3x_2^2 + 5x_3^2$

Subject to the constraints $x_1 + x_2 + 3x_3 = 2$

$5x_1 + 2x_2 + x_3 = 5$

and $x_1, x_2, x_3 \geq 0$

15. a) Solve $2x^3 - 2.5x - 5 = 0$ for the root in [1,2] by Newton Raphson method.

(OR)

b) Minimize $f = x_1^2 + 2x_2^2 + 3x_3^2$

Subject to the constraints :

$k_1 = x_1 - x_2 - 2x_3 \leq 12$

$k_2 = x_1 + 2x_2 - 3x_3 \leq 8$

Using Kuhn-Tucker conditions.

PART – C (1×15=15 Marks)

16. a) The following indicates the details of a project. The durations are in days. 'A' is denoted as optimistic time, 'M' denoted as most likely time, and 'P' denoted as pessimistic time duration.

Activity	1-2	1-3	1-4	2-4	2-5	3-4	4-5
A:	2	3	4	8	6	2	2
M:	4	4	5	9	8	3	5
P:	5	6	6	11	12	4	7

i) Draw the network (3)

ii) Find the critical path (5)

iii) Determine the expected standard deviation of the completion time. (7)

(OR)

b) A Project schedule has the following characteristics :

Activity	1-2	1-4	1-7	2-3	3-6	4-5	4-8	5-6	6-9	7-8	8-9
Duration	2	2	1	4	1	5	8	4	3	3	5

i) Construct a PERT network and find the critical path and the project duration. (7)

ii) Activities 2-3,4-5,6-9 each requires one unit of the same key equipment to complete it. Do you think availability of one unit of the equipment in the organization is sufficient for completing the project without delay; if so what is the schedule of these activities ? (8)

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Question Paper Code : 71693

B.E./B.Tech. DEGREE EXAMINATION, APRIL/MAY 2017.

Seventh Semester

Computer Science and Engineering

CS 6704 – RESOURCE MANAGEMENT TECHNIQUES

(Regulations 2013)

Time : Three hours Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. Explain slack variables of LP problem.

2. What is sensitivity analysis?

3. Define primal and dual problem?

4. Write the difference between the transportation problem and the assignment problem.

5. List different types of Integer programming problems.

6. Write the Gomory's constraint for the all integer programming problem whose simplex table (with non integer solution) given below :

$C_j \rightarrow 2 \quad 20 \quad -10 \quad 0$

Basic variable	C_B	X_B	X_1	X_2	X_3	S_1
x_2	20	$\frac{5}{8}$	0	1	$\frac{1}{5}$	$\frac{3}{40}$
x_1	2	$\frac{5}{4}$	1	0	0	$\frac{1}{4}$
	$z = C_B X_B = 15$		0	0	−14	−1

7. Write down the necessary condition for general non linear programming problem by Lagrange's multiplier method for equal constraints.

8. Define the Jacobian matrix J and the control matrix C.

9. Draw the network for the project whose activities and their precedence relationship are as given below :

Activities :	A	B	C	D	E	F	G	H	I
Precedence :	–	A	A	–	D	B, C, E	F	E	G, H

10. State the rules for network construction.

PART B — (5 × 16 = 80 marks)

11. (a) Solve the following LP problem using graphical method.

Maximize $z = 6x_1 + 8x_2$

Subject to

$5x_1 + 10x_2 \leq 60$

$4x_1 + 4x_2 \leq 60$

x_1 and $x_2 \geq 0$. (16)

Or

(b) Solve the LPP by simplex method

Min $z = x_2 - 3x_3 + 2x_5$

Subject to

$3x_2 - x_3 + 2x_5 \leq 7$

$-2x_2 + 4x_3 \leq 12$

$-4x_2 + 3x_3 + 8x_5 \leq 10$

$x_2, x_3, x_5 \geq 0$. (16)

12. (a) Using dual simplex method solve the LPP

Minimize $z = 2x_1 + x_2$

Subject to

$3x_1 + x_2 \geq 3$

$4x_1 + 3x_2 \geq 6$

$x_1 + 2x_2 \geq 3$

and $x_1, x_2 \geq 0$. (16)

Or

(b) Solve the transportation problem : (16)

	1	2	3	4	Supply
I	21	16	25	13	11
II	17	18	14	23	13
III	32	27	18	41	19
Demand	6	10	12	15	

13. (a) Find the optimum integer solution to the following linear programming problem :

Maximize $z = x_1 + 2x_2$

Subject to

$2x_2 \leq 7$

$x_1 + x_2 \leq 7$

$2x_1 = 11$

and $x_1, x_2 \geq 0$ and are integers. (16)

Or

(b) Use Branch and Bound method to solve the following :

Maximize $z = 2x_1 + 2x_2$

Subject to

$5x_1 + 3x_2 \leq 8$

$x_1 + 2x_2 \leq 4$

and $x_1, x_2 \geq 0$ and integers. (16)

14. (a) Maximize $f(x) = x_1^2 + 2x_2^2 + 10x_3^2 + 5x_1x_2$

Subject to

$g_1(x) = x_1 + x2_2^2 + 3x_2x_3 - 5 = 0$

$g_2(x) = x_1^2 + 5x_1x_2 + x_3^2 - 75 = 0$

Apply the Jacobian method to find $\partial f(x)$ in the feasible neighbourhood of the feasible point $(1,1,1)$. Assume that the feasible neighbourhood is specified by $\partial g_1 = -0.1$, $\partial g_2 = .02$ and $\partial x_1 = .01$. (16)

Or

Reg. No. : | | | | | | | | | | | | |

Question Paper Code : 40920

B.E./B.Tech. DEGREE EXAMINATION, APRIL/MAY 2018

Seventh Semester

Computer Science and Engineering

CS 6704 – RESOURCE MANAGEMENT TECHNIQUES

(Regulations 2013)

Time : Three Hours | Maximum : 100 Marks

Answer ALL questions

PART – A (10×2=20 Marks)

1. List any four application areas of Operation Research.
2. Give any two Limitations of Linear programming.
3. What do you understand by degeneracy in a transportation problem ?
4. How do you convert an unbalanced transportation problem into a balanced ?
5. Can you provide various types of integer programming.
6. State the importance of Integer Programming.
7. What is Newton Raphson method ?
8. Define Kuhn – Tucker conditions.
9. Differentiate between PERT and CPM.
10. Define Pessimistic time estimate in PERT.

PART – B (5×16=80 Marks)

11. a) An automobile manufacturer makes auto-mobiles and trucks in a factory that is divided into two shops. Shop A, which performs the basic assembly operation must work 5 man-days on each truck but only 2 man-days on each automobile. Shop B, which performs finishing operation must work 3 man-days for each truck or automobile that it produces. Because of men and machine limitations shop A has 180 man-days per week available while shop B has 135 man-days per week. If the manufacturer makes a profit of Rs. 300 on each truck and Rs. 200 on each automobile, how many of each should he produce to maximize his profit ?

(OR)

b) Garden Ltd. has two product Rose and Lotus. To produce one unit of Rose, 2 units of material X and 4 units of material Y are required. To produce one unit of Lotus, 3 units of material X and 2 units of material Y are required. At least 16 units of each material must be used in order to meet the committed sales of Rose and Lotus Cost per unit of material X and material Y are Rs. 2.50 per unit and Rs. 0.25 per unit respectively.

Your are required :

i) To formulate mathematical model (8)

ii) To solve it for the minimum cost (Graphically). (8)

12. a) Find the initial basic feasible solution for the following transportation problem by VAM.

		D_1	D_2	D_3	D_4	Availability
Origin	S_1	11	13	17	14	250
	S_2	16	18	14	10	300
	S_3	21	24	13	10	400
Requirements		200	225	275	250	

(OR)

b) Solve the assignment problem for maximization given the profit matrix (profit in rupees).

		Machines			
		P	Q	R	S
Job	A	51	53	54	50
	B	47	50	48	50
	C	49	50	60	61
	D	63	64	60	60

13. a) Solve the following mixed integer programming problem by Gomory's cutting plane algorithm :

Maximize $Z = x_1 + x_2$

Subject to $3x_1 + 2x_2 \leq 5$

$x_2 \leq 2$

and $x_1, x_2 \geq 0$ and x_1 an integer.

(OR)

b) Use Branch and Bound technique to solve the following :

Maximize $Z = x_1 + 4x_2$

Subjects to constraints $2x_1 + 4x_2 \leq 7$

$5x_1 + 3x_2 \leq 15$

$x_1, x_2 \geq 0$ and integers.

14. a) Illustrate Newton – Raphson method with suitable example.

(OR)

b) Illustrate Kuhn – Tucker Conditions with an example.

15. a) Draw the network from the following activity and find the critical path and total duration of project.

Activity	*Immediate Predecessors*	*Duration (Weeks)*
A	–	3
B	–	8
C	A	9
D	B	6
E	C	10
F	C	14
G	C, D	11
H	F, G	10
I	E	5
J	I	4
K	H	1

(OR)

b) A project has the following activities and other characteristics :

Time estimate (in weeks)

Activity	Preceding Activity	Most Optimistic	Most Likely	Most Pessimistic
A	–	4	7	16
B	–	1	5	15
C	A	6	12	30
D	A	2	5	8
E	C	5	11	17
F	D	3	6	15
G	B	3	9	27
H	E, F	1	4	7
I	G	4	19	28

Required :

i) Draw the PERT network diagram (3)

ii) Identify the critical path (3)

iii) Prepare the activity schedule for the project (3)

iv) Determine the mean project completion time (3)

v) Find the probability that the project is completed in 36 weeks (4)

Reg. No. : | | | | | | | | | | | | |

Question Paper Code : 52877

B.E./B.Tech. DEGREE EXAMINATIONS, APRIL/MAY 2019.

Seventh Semester

Computer Science And Engineering

CS 6704 – RESOURCE MANAGEMENT TECHNIQUES

(Regulation 2013)

Time : Three hours Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. What is OR techniques? Where it can be used?

2. Define following terms. (a) Solution (b) Feasible solution.

3. Explain degeneracy in transportation problem.

4. Write down the steps of North West Corner Method for solving transportation problem.

5. Why integer programming is needed? Generalize it.

6. Summarize the main disadvantage of the branch and bound method.

7. List the uses of classical optimization theory.

8. Describe the concepts of Lagrangian multiplier.

9. Illustrate the primary rules for Network construction.

10. Point out the uses of GANTT chart.

PART B — (5 × 13 = 65 marks)

11. (a) Solve by Simplex Method

(i) Max $Z = 3x_1 + 4x_2$

Subject to the conditions

$2x_1 + 4x_2 \leq 120;\ 2x_1 + 2x_2 \leq 80;\ x_1 \geq 0, x_2 \geq 0.$

(ii) Maximize $Z = 3x_1 + 2x_2 + 5x_3$

Subject to Constraints

$x_1 + x_2 + x_3 \leq 9;\ 2x_1 + 3x_2 + 5;\quad x_3 \leq 30;\quad 2x_1 - x_2 - x_3 \leq 8$ and $x_1, x_2, x_3 \geq 0.$

Or

(b) The advertising alternative for a company include television, radio, and newspaper advertisements. The costs and estimates for audience coverage are given in the table below.

	Television	Radio	Newspaper
Cost per advertisement	£2,000	£300	£600
Audience per advertisement	1,00,000	18,000	40,000

The local newspaper limits the number of weekly advertisements from a single company to ten. Moreover, in order to balance the advertising among the three types of media, no more than half of the total number of advertisements should occur on the radio, and at least 10% should occur on television. The weekly advertising budget is £18,200. How many advertisements should be run in each of the three types of media to maximize the total audience?

12. (a) Find the initial feasible solution for the following problem using North West Corner Method. Optimize solution using stepping stone.

Consumption centres	Warehouses				Requirements (Units)
	P1	P2	P3	P4	
C1	10	4	9	5	25
C2	6	7	8	7	25
C3	3	8	6	9	25
Capacity	9	28	20	18	

Or

(b) Solve by Vogel"s Approximation Method.

Plants	Warehouses					Supply
	W1	W2	W3	W4	W5	
P1	20	28	32	55	70	50
P2	48	36	40	44	25	100
P3	35	55	22	45	48	150
Demand	100	70	50	40	40	300

13. (a) Discuss Gomary's Cutting plane method and solve it. Maximize $z = x_1 + 4x_2$ Subject to $2x_1 + 4x_2 \leq 7, 5x_1 + 3x_2 \leq 15$; x_1, x_2 are integers ≥ 0.

Or

(b) Summarize and find the optimum integer solution to the following all I.P.P:

Maximize $z = x_1 + 2x_2$

Subject to $2x_2 \leq 7$; $x_1 + x_2 \leq 7$; $2x_1 \leq 11$; $x_1, x_2 \geq 0$ and integers.

14. (a) Discuss the Non Linear programming problem and solve by using Legrange multipliers with equality constraints.

Maximize $Z = 4x_1 - 0.1x_1^2 + 5x_2 - 0.2x_2^2$

Subject to $x_1 + 2x_2 = 40$; $x_1, x_2 \geq 0$

Or

(b) Describe in detail about the Newton-Raphson method.

15. (a) A project has the following characteristics. Construct a own PERT network. Find critical path and variance for each event and also analyze it.

Or

(b) A project consists of the following activities as shown in table. The duration in weeks and the manpower requirement for each of the activities are also summarized in the same table. Find and give the project schedule which minimizes the peak manpower requirement and also minimizes period-to-period variation in manpower requirement (number of iteration = 2).

Activity	Duration (months)	Manpower Required
1-2	5	12
1-3	6	4
2-3	8	6
2-4	7	3
3-4	4	8
2-5	1	4
3-5	6	3
5-6	7	4
4-6	5	2

PART C — (1 × 15 = 15 marks)

16. (a) Unit profit of five salesmen in four places are given below

	S_1	S_2	S_3	S_4	S_5	Available
P_1	5	6	4	2	6	40
P_2	7	9	5	2	5	50
P_3	3	3	3	2	4	60
P_4	7	8	5	4	4	50
Demand	40	30	40	40	30	

Solve the problem to maximize the profit.

Or

(b) Solve the integer programming problem

Maximize $Z = 80x_1 + 45x_2$

Subject to

$x_1 + x_2 \leq 7$

$12x_1 + 5x_2 \leq 60$

and $x_1, x_2 \geq 0$ and integer.

Reg. No. : | | | | | | | | | | | | |

Question Paper Code : 50365

B.E./B.Tech. DEGREE EXAMINATION, NOVEMBER/DECEMBER 2017

Seventh/Eighth Semester

Computer Science and Engineering

CS6003 – ADHOC AND SENSOR NETWORKS

Common to Biomedical Engineering, Electronics and Communication Engineering/ Information Technology

(Regulations 2013)

Time : Three Hours | Maximum : 100 Marks

Answer ALL questions :

PART – A (10×2=20 Marks)

1. State Shannon's theorem.
2. What is fading ? List the different types of fading ?
3. Write down the issues of designing a MAC protocol for Ad-hoc networks.
4. Outline how node scheduling is done in contention-based MAC protocols with scheduling mechanisms.
5. What is called hybrid routing ?
6. Write down the difference between proactive and reactive routing.
7. List out the hardware and software components of a sensor node.
8. Write down the various operational states of transceiver in WSN.
9. Define localization, lateration.
10. Define the term data dissemination.

PART – B (5×16=80 Marks)

11. a) Explain.
    i) Challenges of mobile adhoc networks. (8)
    ii) Electromagnetic spectrum. (8)

(OR)

    b) i) Differentiate adhoc and cellular network. (8)
    ii) Write the advantages of directional antennas of MMAC over MACAW. (8)

12. a) Describe the scheduling mechanism achieved in distributed wireless ordering protocol. Explain how the information symmetry and perceived collisions are handled. (16)

(OR)

    b) Elaborately explain different steps involved in five phase reservation protocol with its frame format. (16)

13. a) Explain various protocols used in multicast routing in detail. (16)

(OR)

    b) i) Explain the demand routing protocol in detail. (8)
    ii) Discuss MAC protocol in WSN in detail. (8)

14. a) Explain localization and its services with examples. (16)

(OR)

    b) i) Explain IEEE 802.15.4 in detail. (8)
    ii) With neat sketch discuss sensor network architecture. (8)

15. a) Discuss in detail about triangulation. (16)

(OR)

    b) Explain :
    i) Physical time.
    ii) QoS challenges.
    iii) Issues in WSN routing.
    iv) OLSR routing protocol. (16)

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Reg. No. : | | | | | | | | | | | | |

Question Paper Code : 20341

B.E./B.Tech. DEGREE EXAMINATION, NOVEMBER/DECEMBER 2018.

Seventh / Eighth Semester

Computer Science and Engineering

CS 6003 – AD HOC AND SENSORS NETWORKS

(Common to Biomedical Engineering, Electronics and Communication Engineering, Information Technology)

(Regulations 2013)

(Also common to PTCS 6003 – Ad Hoc and Sensors Networks for B.E. (Part-Time) Sixth Semester – Computer Science and Engineering and Seventh Semester – Electronics and Communication Engineering, Regulations – 2014)

Time : Three hours Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. Define the term: Internet Protocol (IP).
2. Differentiate between WSNs and MANETs.
3. What is meant by Internet Proxy?
4. What is slotted ALOHA?
5. What is the need for Routing Protocols?
6. Mention the QoS parameters.
7. What is Data relaying?
8. What is Sensor Network Localization?
9. Why is energy efficiency important in WSN Routing?
10. What is Synchronized communication?

PART B — (5 × 13 = 65 marks)

11. (a) Describe the characteristics of Wireless Channel in detail.

Or

(b) (i) Explain briefly the architecture of MANET with a neat diagram. (7)

(ii) Describe the characteristics, requirements and applications of Ad Hoc and Sensor Networks. (6)

12. (a) Explain in detail the principle of contention based protocols with scheduling mechanism. (13)

Or

(b) Discuss the classification of MAC protocols. Explain the principle of contention based reservation mechanism. (13)

13. (a) Describe in detail the design issues in routing and transport layer protocols. (13)

Or

(b) Explain the various classical improvements over TCP in mobile with environment.

14. (a) Outline the hardware and software components of a Sensor Node with a block diagram.

Or

(b) Explain data aggregation strategies in WSNs. (13)

15. (a) Distinguish between Absolute and Relative Localization in detail. (13)

Or

(b) Describe about OLSR routing protocol with an example. (13)

PART C — (1 × 15 = 15 marks)

16. (a) How will you conduct Mathematical analysis of routing, based on Circular Graphs? Illustrate with an example. (15)

Or

(b) How will you estimate the technical challenges related to the information flow in a network and the communication costs imposed by different algorithms? Illustrate with suitable examples. (15)

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Reg. No. : | | | | | | | | | | | | |

Question Paper Code : 91375

B.E./B.Tech. DEGREE EXAMINATIONS, NOVEMBER/DECEMBER 2019

Seventh/Eighth Semester

Computer Science and Engineering

CS 6003 – AD HOC AND SENSOR NETWORKS

(Common to Electronics and Communication Engineering/Biomedical Engineering/Electronics and Communication Engineering/Information Technology)

(Regulations 2013)

(Also Common to PTCS 6003 – Ad hoc and Sensor Networks for B.E. Part-Time – Computer Science and Engineering – Sixth Semester – Electronics and Communication Engineering – Seventh Semester – Regulations 2014)

Time : Three Hours | Maximum : 100 Marks

Answer ALL questions

PART – A (10×2=20 Marks)

1. Define attenuation.
2. Distinguish between shadowing and reflection of signal propagation.
3. Abbreviate FAMA and write a brief note.
4. What are the mechanisms used in the MAC layer ?
5. What is the need for power management in Ad hoc network ?
6. Why does TCP not work well in Ad hoc network ?
7. Draw the diagram for sensor node hardware components.
8. List the features of 802.15 standards.
9. Define Delay and Jitter.
10. Name the three types of control messages used in OLSR.

PART – B (5×13=65 Marks)

11. a) i) What are the characteristics and features of Ad hoc networks ? (7)

ii) Differentiate between cellular network and Ad hoc network (any 6). (6)

(OR)

b) How the path loss and Fading affect in Wireless Channel ? Elaborate. (13)

12. a) Classify the MAC protocols and explain the contention based protocols with scheduling and reservation in detail. (13)

(OR)

b) Explain the qualities of service metrics that are used to evaluate the performance of the network. (13)

13. a) An Ad hoc network has 7 nodes namely A, B, C, D, E, F and G and one node can reach other node by one or more hops. The node named B which is nearer to node D is now moved near to node G. Using DSDV show the topology and routing table of node B before and after movement. Give the final routing table of node B. (13)

(OR)

b) How is routing table constructed in fisheye state routing protocol ? Explain in detail. (13)

14. a) Explain in detail about MAC protocols of Wireless Sensor Network. (13)

(OR)

b) Discuss in detail about IEEE 802.15.4 protocol stack. (13)

15. a) What is meant by OLSR and explain about OLSR routing protocol with an example. (13)

(OR)

b) Discuss in detail on sensor network absolute and relative localization. (13)

PART – C (1×15=15 Marks)

16. a) TCP has become standard transport protocol for computer communication. This allows slow start increase of transmission rate when doing cold start and then adjust rate when a threshold is crossed. Why do you have several variations of TCP and what are their relative advantages and disadvantages ? Are any of these variation suited for Wireless Ad hoc networks ? How does the hidden terminal problem affect TCP over multihop transmission ? (15)

(OR)

b) 500 sensors are randomly deployed in a rectangular area of 40 × 40. Draw a Varonoi diagram. Apply the Delaunay triangulation to determine the maximum cost path between node 250 to 287 using graph search traversal method. Derive the analytical model between the densities of the nodes, coverage and sleep cycle. (Assume appropriate parameters if required as commonly used in literature). (15)

Reg. No. : | | | | | | | | | | | | |

Question Paper Code : 71656

B.E./B.Tech. DEGREE EXAMINATION, APRIL/MAY 2017.

Seventh/Eighth Semester

Computer Science and Engineering

CS 6003 – AD HOC AND SENSORS NETWORKS

(Common to : Biomedical Engineering / Electronics and Communication Engineering / Information Technology)

(Regulations 2013)

Time : Three hours Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. Define a wireless sensor network.
2. State the difference between cellular network and Ad hoc wireless network.
3. Define packet delivery ratio.
4. What is a contention based protocol?
5. How the table driven protocols work in Ad hoc network?
6. What is hybrid routing?
7. List the components of a sensor node.
8. Define data relaying in a wireless sensor network.
9. Outline the need for data dissemination in a wireless sensor network.
10. Define quality of service.

PART B — (5 × 16 = 80 marks)

11. (a) (i) Discuss the characteristics of wireless channel. (6)

(ii) Explain the radio propagation mechanisms. (10)

Or

(b) (i) What is multipath propagation? Explain with an example how it affects the signal quality. (6)

(ii) Explain the design issues in Ad Hoc networks. (10)

12. (a) Discuss the issues in designing of MAC protocol for Ad Hoc networks. (16)

Or

(b) Classify MAC protocols for Ad Hoc networks and present an overview of the same. (16)

13. (a) Discuss any four reactive routing protocols for Ad Hoc wireless networks. (16)

Or

(b) What is TCP? Discuss with an example TCP over Ad Hoc wireless networks. (16)

14. (a) Discuss the architecture of wireless sensor network with diagrammatic illustration. (16)

Or

(b) Present an overview of MAC protocols for wireless sensor networks. (16)

15. (a) (i) Appraise the issues related to routing in wireless sensor networks. (8)

(ii) Present an overview of localization in wireless sensor networks. (8)

Or

(b) (i) Appraise the QoS related measures in wireless sensor networks. (8)

(ii) Outline the issues related to the transport layer in wireless sensor networks. (8)

Reg. No. : | | | | | | | | | | | | |

Question Paper Code : 40883

B.E./B.Tech. DEGREE EXAMINATION, APRIL/MAY 2018
Seventh/Eighth Semester
Computer Science and Engineering
CS 6003 – AD HOC AND SENSORS NETWORKS
(Common to : Biomedical Engineering/Electronics and Communication Engineering/Information Technology)
(Regulations 2013)

Time : Three Hours | Maximum : 100 Marks

Answer ALL questions

PART – A (10×2=20 Marks)

1. Compare between fast fading and slow fading.
2. List the three radio waves propagation mechanisms.
3. How mobility of nodes affects the throughout in wireless networks ?
4. How does Multi-Hop Coordination mechanism work ?
5. Differentiate intra-zone and inter-zone routing protocol in hybrid routing.
6. Sketch the classification tree of transport layer protocol.
7. List some design challenges posed by sensor networks.
8. What is data aggregation strategy in wireless sensor networks ?
9. List the benefits of OLSR protocol.
10. What is Multi-Lateration (ML) technique ? List some of the ML techniques.

PART – B (5×16=80 Marks)

11. a) i) Describe about the electromagnetic spectrum and its frequency bands with its uses. (8)
    ii) Explain about the characteristics of the wireless channel. (8)

(OR)

b) Discuss in detail about the design challenges in Ad hoc and sensor networks. (16)

12. a) i) Sketch the transmission in Busy Tone Multiple Access (BTMA) protocol and explain it. (7)

ii) Write in detail about the Five Phase Reservation Protocol (FPRP) and its frame structure. (9)

(OR)

b) i) Illustrate the operation of Multichannel MAC Protocol. (6)

ii) Explain about the contention based MAC protocols with scheduling mechanisms. (10)

13. a) i) Discuss the operation of AODV routing protocols with neat diagram. (10)

ii) Identify the major reasons behind that TCP not perform well in Ad hoc Networks. (6)

(OR)

b) i) Explain the DSR routing protocols with neat diagram. (8)

ii) Illustrate the operations of Ad Hoc TCP and split TCP with neat diagram. (8)

14. a) Explain in detail about the single node architecture in wireless sensor networks. (16)

(OR)

b) Describe in depth about the MAC Protocols for Sensor Networks. (16)

15. a) Discuss on the parameters of Coverage and Exposure to improve the quality of sensor Networks. (16)

(OR)

b) i) Why synchronization is essential in Multi-Hop wireless networks ? Discuss how shifting of frames carried out in resynchronization. (10)

ii) Write short notes on Transport Layer issues in sensor networks. (6)

Reg. No. : | | | | | | | | | | | | |

Question Paper Code : 52840

B.E./B.Tech. DEGREE EXAMINATIONS, APRIL/MAY 2019.

Seventh/Eighth Semester

Computer Science and Engineering

CS 6003 — AD HOC AND SENSOR NETWORKS

(Common to : Electronics and Communication Engineering/Biomedical Engineering/Electronics and Communication Engineering/Information Technology)

(Regulation 2013)

(Also common to PTCS 6003 – AD Hoc and Sensor Networks for B.E. (Part-Time) – Computer Science and Engineering – Sixth/Seventh Semester – Electronics and Communication Engineering – Regulations 2014)

Time : Three hours

Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. Given a channel with an intended capacity of 20 Mbps, the bandwidth of the channel is 3 MHz what signal-to-noise (SNR) ratio is required to achieve this capacity?

2. Differentiate address centric paradigm and data centric paradigm.

3. List the issues of designing a MAC protocol for ad hoc networks.

4. Draw the frame format of IEEE802.11 physical layer using DSSS.

5. What is the use of route caching in the Dynamic Source Routing (DSR) protocol?

6. Can we use the traditional TCP for the Ad hoc network? Justify.

7. How an implosion is caused?

8. What is data aggregation?

9. Define Lateration, Angulation.

10. Write the equation for calculating the sensing power of a node.

PART B — (5 × 13 = 65 marks)

11. (a) (i) What is multipath propagation? Explain with an example how it affects the quality of the signal. (7)

(ii) What are the main problems of signal propagation? Why do radio waves not always follow the straight line? (6)

Or

(b) Tabulate the difference between the cellular network and Ad hoc network (any TEN). (13)

12. (a) Explain the contention based protocols with scheduling and reservation in detail. (13)

Or

(b) Illustrate various steps involved in five phase reservation protocol with its frame format. (13)

13. (a) An Ad hoc network has 8 nodes and one node can reach other node by one or more hops. The node number 3 which is nearer to node 4 is now moved near to node 7. Using DSR show the topology and routing table of node 3 before and after movement. Give the final routing table of node 3. (13)

Or

(b) Discuss the reasons why TCP does not perform well in Ad hoc wireless network? Elaborate in detail about the classification of transport layer solutions. (13)

14. (a) With a neat sketch explain the architecture of wireless sensor networks. (13)

Or

(b) (i) How the data dissemination is performed in the sensor networks? Explain in detail. (9)

(ii) Discuss the various types (any four) of sensors. (4)

15. (a) Illustrate the working principle of OLSR with neat sketch. (13)

Or

(b) (i) Explain in detail about trilateration and triangulation. (8)

(ii) Write short notes on QOS in WSN. (5)

PART C — (1 × 15 = 15 marks)

16. (a) Discuss in detail about IEEE 802.11. (15)

Or

(b) Explain the types of routing protocol in WSN. Give example. (15)

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Reg. No. : | | | | | | | | | | | | |

Question Paper Code : 50400

B.E./B.Tech. DEGREE EXAMINATION, NOVEMBER/DECEMBER 2017
Seventh/Eighth Semester
Computer Science and Engineering
CS 6702 – GRAPH THEORY AND APPLICATIONS
(Regulations 2013)

Time : Three Hours | Maximum : 100 Marks

Answer ALL questions

PART – A (10×2=20 Marks)

1. Determine the number of vertices for a graph G, which has 15 edges and each vertex has degree 6. Is the graph G be a simple graph ?
2. Suppose G is a finite cycle-free connected graph with at least one edge. Show that G has at least two vertices of degree 1.
3. In a tree, every vertex is a cut-vertex. Justify the claim.
4. A simple planar graph to which no edge can be added without destroying its planarity (while keeping the graph simple) is a maximal planar graph. Prove that every region in a maximal planar graph is a triangle.
5. Prove that a graph of n vertices is a complete graph iff its chromatic polynomial is $Pn(\lambda) = \lambda(\lambda-1)(\lambda-2)....(\lambda-n+1)$.
6. Define the two types of connectedness in digraphs. Give examples.
7. THALASSEMIA is a genetic blood disorder. How many ways can the letters in THALASSEMIA be arranged so that all three A's together ?
8. Determine the number of positive integers n, $1 \le n \le 100$, that are not divisible by 3 or 7.
9. Find the coefficient of x^6 in $(3-5x)^{-8}$.
10. The number of virus affected files in a system is 500 (approximately) and this doubles every four hours. Using a recurrence relation, determine the number of virus affected files in the system after one day.

PART – B (5×16=80 Marks)

11. a) Encrypt the following using play fair cipher using the keyword MONARCHY. "SWARAJ IS MY BIRTH RIGHT". Use X for blank spaces.

(OR)

b) Discuss the properties that are to be satisfied by Groups, Rings and Fields.

12. a) Users Alice and Bob use the Diffie-Hellman key exchange technique with a common prime q = 83 and a primitive root $\alpha = 5$.
    i) If Alice has a private key $X_A = 6$, what is Alice's public key Y_A ? (6)
    ii) If Bob has a private key $X_B = 10$, what is Bob's public key Y_B ? (6)
    iii) What is the shared secret key ? (4)

(OR)

b) For each of the following elements of DES, indicate the comparable element in AES if available.
    i) XOR of subkey material with the input to the function. (4)
    ii) f function. (4)
    iii) Permutation p. (4)
    iv) Swapping of halves of the block. (4)

13. a) Write down the steps involved in
    i) Elgamal Digital Signature Scheme. (8)
    ii) Schnorr Digital Signature Scheme.
    used for authenticating a person. (8)

(OR)

b) With a neat diagram, explain the steps involved in SHA algorithm for encrypting a message with maximum length of less than 2^{128} bits and produces as output a 512-bit message digest.

14. a) Explain how secure electronic transaction (SET) protocol enables e-transactions in details. Explain the components involved.

(OR)

b) Discuss how firewalls help in the establishing a security framework for an organization.

15. a) i) Discuss the different methods involved in authentication of the source. (8)
    ii) Write about how the integrity of message is ensured without source authentication. (8)

(OR)

b) i) Write the steps involved in the simplified form of the SSL/TLS protocol. (8)
    ii) Write the methodology involved in computing the keys in SSL/TLS protocol. (8)

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Reg. No. : | | | | | | | | | | | | |

Question Paper Code : 20376

B.E./B.Tech. DEGREE EXAMINATION, NOVEMBER/DECEMBER 2018.

Seventh/Eighth Semester

Computer Science and Engineering

CS 6702 — GRAPH THEORY AND APPLICATIONS

(Common to Information Technology)

(Regulations 2013)

Time : Three hours Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. For which of the following does there exist a simple graph $G=(V, E)$ satisfying the specified conditions?

   (a) It has 3 components 20 vertices and 16 edges

   (b) It is connected and has 10 edges 5 vertices and fewer than 6 cycles.

   (c) It has 7 vertices, 10 edges and more than two components.

2. The maximum degree of any vertex in a simple graph with n vertices is $n-1$. Give reasons.

3. Calculate the maximum flow between the nodes A and F in the graph Fig 3. The number on a line represents the capacity.

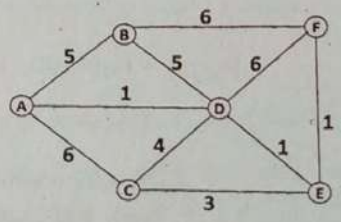


Figure – 3

4. Define Homeomorphic graphs and give example graphs.

5. What is meant by independent set and maximal independent set of a graph?

6. What is meant by regularization of a planar graph? Give an example.

7. How many ways can the letters in ENGINEERING be arranged so that all three E's together?

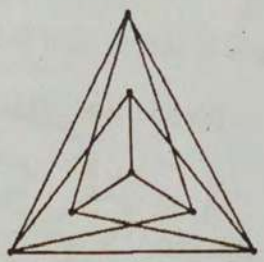
8. Determine the number of positive integers n, $1 \leq n \leq 500$, that are not divisible by 5 or 5.

9. Define generating function. Give an example to a polynomial and a power series.

10. Write a homogeneous and a non-homogeneous recurrence relations.

PART B — (5 × 13 = 65 marks)

11. (a) (i) Draw a graph isomorphic to the graph G shown in Figure 11(a) (i) such that no edge is crossing others. (5)



G

Figure – 11 (a) (i) .

(ii) Define walk, circuit, path and subgraph. From the graph shown in figure 11(a)(ii), draw a walk of any length, a path of length 5, a circuit of length 4 and subgraph of 4 vertices and 5 edges. (8)

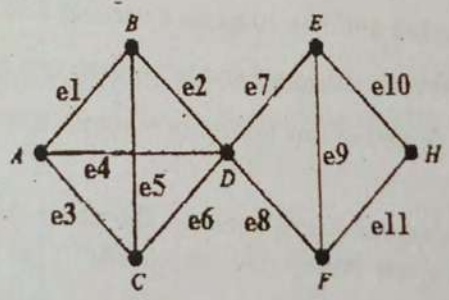


Figure – 11 (a) (ii)

Or

(b) (i) Seven children in a street play a game in a circular arrangement. If no child holds hands with the same playmate twice, how many times can this arrangement possible? Write all possible arrangements. (5)

(ii) Prove that there are at least two pendant vertices in a tree with two or more vertices. Also prove that every tree has one or two centers. (8)

12. (a) (i) Prove that the distance between any two spanning trees is a metric. Find two different minimum spanning trees of a graph with $V=\{1,2,3,4\}$ is described by

$\varphi=\begin{pmatrix} a & b & c & d & e & f \\ \{1,2\} & \{1,2\} & \{1,4\} & \{2,3\} & \{3,4\} & \{3,4\} \end{pmatrix}$. It has weights on its edges given by $\lambda=\begin{pmatrix} a & b & c & d & e & f \\ 3 & 2 & 1 & 2 & 4 & 2 \end{pmatrix}$. (7)

(ii) Prove that an Euler graph cannot have a cut-set with an odd number of edges. (6)

Or

(b) (i) Construct a graph G with the following properties: Edge connectivity of G = 4, vertex connectivity of G = 3, and degree of every vertex of $G \geq 5$. (7)

(ii) Derive the formula for the number of regions in a planar graph, G with n vertices and e edges. Also prove that a planar graph with triangle regions can have at most $(3n-6)$ edges. (6)

13. (a) (i) Define chromatic polynomial and write the chromatic polynomial of a graph with n vertices. (5)

(ii) Define complete matching and minimal covering in a graph G. Give one application example to each. (8)

Or

(b) (i) Define the following and give one example to each.

(1) Complete symmetric digraph

(2) Balanced digraph

(3) Equivalence graph

(4) Accessibility in a digraph. (8)

(ii) When is a digraph an Euler digraph? Draw an Euler digraph. (5)

14. (a) Determine the number of six digit integers (no leading zeros) in which

(i) No digit may be repeated;

(ii) Digits may be repeated. Answer parts

(i) and (ii) with the extra condition that the six digit number even; Also do the same with the condition that the number is divisible by 5. (13)

Or

(b) At a nursery, Reshmi wants to arrange 15 different plants on five shelves for a window display. In how many ways can she arrange them so that each shelf has at least one, but no more than four plants? (13)

15. (a) (i) What is Ferrer's graph? Give an example Ferrer's graph and its transposition graph. (5)

(ii) Explain exponential generating function with an example. (8)

Or

(b) (i) Explain the summation operator with an example. (5)

(ii) What is meant by a recurrence relation? Write one applications of each first order and second order linear homogeneous recurrence relation with examples. (8)

PART C — (1 × 15 = 15 marks)

16. (a) Can the kolams shown in figure 16 (a) (i) and (ii) be drawn without lifting your hands and not overdrawing any part of the kolam? Substantiate your answers with graph theory knowledge. If not possible, make it possible by adding some curves. (8+7)

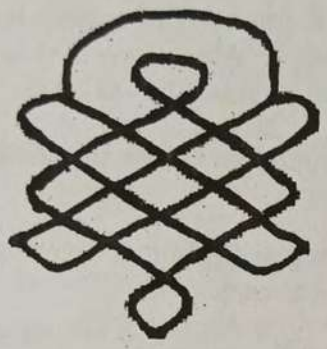


Figure – 16 (a) (i)

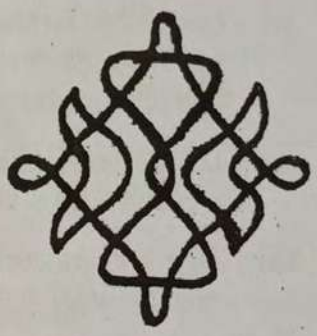


Figure – 16 (a) (ii)

Or

(b) (i) Stack the blocks shown in figure 16 (b) (i) in a pile of 4 in such a way that each of the colors appears exactly once on each of the four sides of the stack. (7)

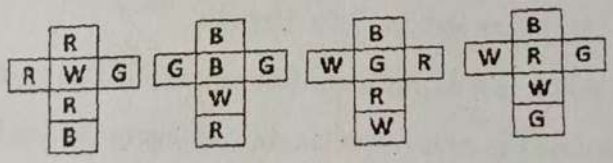


Figure – 16 (b) (i)

(ii) A young pair of rabbits, one of each sex, is placed on an island. A pair of rabbits does not breed until they are 2 months old. After they are 2 months old, each pair of rabbits produces another pair each month. Assume that none of the rabbits die. How many rabbits are there after n months? (8)

Reg. No. : | | | | | | | | | | | | |

Question Paper Code : 91410

B.E./B.Tech. DEGREE EXAMINATIONS, NOVEMBER/DECEMBER 2019
Seventh/Eighth Semester
Computer Science and Engineering
CS 6702 – GRAPH THEORY AND APPLICATIONS
(Common to Information Technology)
(Regulations 2013)

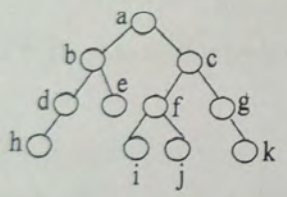
Time : Three Hours | Maximum : 100 Marks

Answer ALL questions

PART – A (10×2=20 Marks)

1. Define circuit.

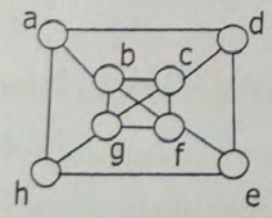
2. Find path length of the following tree.



3. How will you calculate rank of a graph ?

4. Is K_6 is a planar graph ? Justify it.

5. Find at least two dominating set for the following graph.



6. Define asymmetric digraphs.

7. In how many ways can a president, a treasurer and a secretary be chosen among 7 candidates ?

8. How many arrangements of the letter ARRANGE can be made ?

9. Find the generating function for the sequence of numbers 4, 4, 4, 4, 4 . . . . . .

10. Find the recurrence relation for the numbers 1, 5, 17, 53, 161, 485, ...

PART – B **(5×13=65 Marks)**

11. a) i) Show that the maximum number of edges in a simple graph with n vertices is $n(n-1)/2$. **(7)**

ii) Prove that any two simple connected graphs with n vertices, all of degree two, are isomorphic. **(6)**

(OR)

b) i) Prove that a simple graph with n vertices and k components can have at most $(n-k)(n-k+1)/2$ edges. Give an example. **(6)**

ii) Prove that if a connected graph G is decomposed into subgraph g_1 and g_2, there must be at least one vertex common between g_1 and g_2. **(7)**

12. a) i) Show that a Hamiltonian path is a spanning tree. Explain. **(6)**

ii) A connected planar graph with n vertices and e edges has $e - n + 2$ regions. **(7)**

(OR)

b) i) What does cyclomatic number represent ? How it will be calculated ? Explain it ? **(6)**

ii) Prove that the vertex connectivity of any graph can never exceed the edge connectivity. **(7)**

13. a) i) A graph of n vertices is a complete graph iff its chromatic polynomial is $P_n(\lambda) = \lambda(\lambda-1)(\lambda-2)\ldots.(\lambda-n+1)$ **(7)**

ii) A covering g of a graph is minimal iff g contains no paths of length three or more. **(6)**

(OR)

b) i) A graph with atleast one edge is 2-chromatic iff it has no circuits of odd length. **(7)**

ii) Prove that any digraph, the sum of the in-degrees of all vertices is equal to sum of its out-degrees. **(6)**

a) i) In how many ways can an interview panel of 3 members be formed from 3 Engineers, 2 Psychologists and 3 Managers if atleast 1 Engineer must be included ? (6)

ii) Find the number of positive integers not exceeding 100 that are not divisible by 5 or 7. (7)

(OR)

b) i) How many binary strings of length 8 that do not contain atleast 8 consecutive 0's ? (7)

ii) How many words can be formed by using the letters from the word "DRIVER" such that all the vowels are never together ? (6)

15. a) i) The sequence 1, 3, 7, 15, 31, 63,... satisfies the recurrence relation $a_n = 3a_{n-1} - 2a_{n-2}$ Find the generating function for it. (7)

ii) Find the sequence generated by the following generation function

$$\frac{1}{1-4x}.$$ (6)

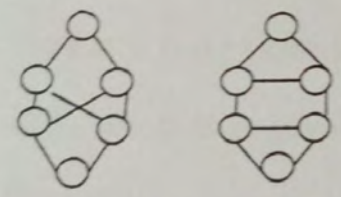
(OR)

b) i) Find the generating function for the sequence 1, –2, 4, –8, 16,.... (6)

ii) Find the generating function for the Fibonacci sequence using recurrence relation. (7)

PART – C (1×15=15 Marks)

16. a) i) How can you verify the graphs are isomorphic ? Are the following graphs are isomorphic ? Justify it. (6)



ii) Explain Kruskal's method with suitable example. (9)

(OR)

b) i) Write short notes on Dimer problem. (7)

ii) Discuss about exponential generating functions with suitable example. (8)

Reg. No. : | | | | | | | | | | | | |

Question Paper Code : 71691

B.E./B.Tech. DEGREE EXAMINATION, APRIL/MAY 2017.

Seventh/Eighth Semester

Computer Science and Engineering

CS 6702 — GRAPH THEORY AND APPLICATIONS

(Common to Information Technology)

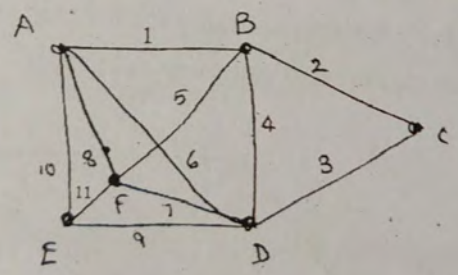
(Regulations 2013)

Time : Three hours Maximum : 100 marks

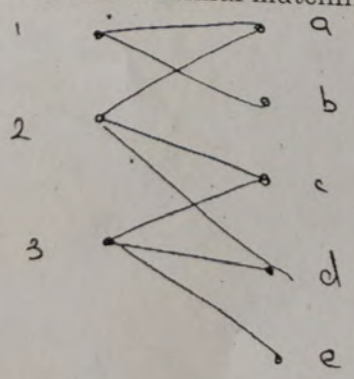
Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. Define Euler graph. Show that an Euler graph is connected except for any isolated vertices the graph may have.
2. Can there be a path longer than a Hamiltonian path (if any) in a simple, connected, undirected graph? Why?
3. Define planar graphs.
4. Identify two spanning trees for the following graph :



5. Does the following graph have a maximal matching? Give reason.



6. Draw K_8 and K_9 and show that thickness of K_8 is 2 while thickness of K_9 is 3.

7. State the rule of sum, the first principle of counting.

8. Use Venn diagram to represent the following scenario :

If S : a set, C_1 = condition 1 and C_2 – condition 2 satisfied by some elements of S, indicate on the diagram – S, $N(C_1)$, $N(C_2)$ $N(C_1, C_2)$ and $N(\overline{C}_1, \overline{C}_2)$.

9. Give explanation for the following :
Generating function for
the no. of ways to have
n cents in pennies and nickels
$= (1 + x + x^2 + ...)(1 + x^5 + x^{10} + ...)$

10. Solve the recurrence relation $a_{n+1} - a_n = 3n^2 - n \quad n \geq 0 \quad a_0 = 3$.

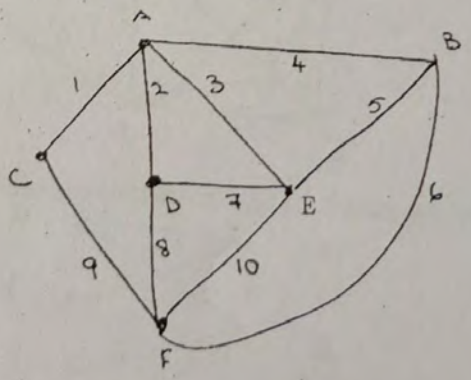
PART B — (5 × 16 = 80 marks)

11. (a) Define the following terms :

(i) Walk
(ii) Euler path
(iii) Hamiltonian path
(iv) Subgraph
(v) Circuit
(vi) Complete graph

From the given graph draw the following : (6)

(vii) Walk of length 6
(viii) Is this an Euler graph? Give reasons
(ix) Is there a Hamiltonian path for this graph? Give reasons
(x) Find atleast two complete subgraphs (10)



Or

(b) (i) List any five properties of trees. (6)

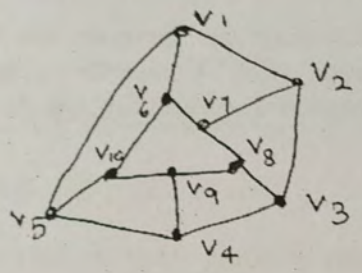
(ii) Define eccentricity of a vertex V in a tree T and give an example tree and its eccentricity from the root. (10)

12. (a) (i) Define spanning tree and give an example.

(ii) A farm has six walled plots full of water. The graph representation of it is given below. Use the concepts of spanning tree, cutsets appropriately to determine the following :

(1) How many walls will have to be broken so that all the water can be drained out?

(2) If only one plot was full of water and this had to be drained into all other plots, then how many walls need to be broken?



Or

(b) State the Eulers formula relating the number of vertices, edges and faces of a planar connected graph. Give two conditions for testing for planarity of a given graph. Give a sample graph that is planar and another that is non-planar.

13. (a) Describe the steps to find adjacency matrix and incidence matrix for a directed graph with a simple example.

Or

(b) Write a note on chromatic polynomials and their applications.

14. (a) In how many ways can the 26 letters of the alphabet be permuted so that the patterns car, dog, pun or byte occures? Use the principle of inclusion and exclusion for this.

Or

(b) When n balls numbered 1, 2, 3 ... n are taken in succession from a container, a rencontre occurs if m^{th} ball withdrawn is numbered $m, 1 \leq m \leq n$.

Find the probability of getting

(i) no rencontres.

(ii) exactly one rencontre

(iii) Atleast one rencontre and

(iv) r rencontries $1 \leq r \leq n$. Show intermediate steps.

15. (a) If a_n is count of number of ways a sequence of 1s and 2s will sum to n, for $n \geq \theta$. Eg $a_3 = 3$ (i) 1, 1, 1 ; (ii) 1, 2, and (iii) 2, 1 sum up to 3.

Find and solve a sequence relation for a_n.

Or

(b) What are Ferrers diagrams? Describe how they are used to (i) represent integer partition (ii) Conjugate diagram or dual partitions (iii) self-conjugates (iv) representing bisections of two partition.

Reg. No. : | | | | | | | | | | | | |

Question Paper Code : 40918

B.E./B.Tech. DEGREE EXAMINATION, APRIL/MAY 2018
Seventh/Eighth Semester
Computer Science and Engineering
CS 6702 – GRAPH THEORY AND APPLICATIONS
(Common to : Information Technology)
(Regulations 2013)

Time : Three Hours | Maximum : 100 Marks

Answer ALL questions

PART – A (10×2=20 Marks)

1. Define the terms with respect to graph : walk and path.
2. State two properties of binary tree.
3. Define fundamental circuit in a graph.
4. State Kuratowski's theorem.
5. Let a graph G is 2 – chromatic, then prove that it is bipartite.
6. Define minimal covering.
7. Find the number of ways in which the letters of the word TRIANGLE can be arranged such that vowels occur together ?
8. Find the number of non-negative integral solutions to $x_1 + x_2\ x_3 + x_4 = 20$.
9. Find the exponential generating function of the sequence 0!, 1!, 2!, 3!, . . .
10. Determine the coefficient of x^{15} in $f(x) = (x^2 + x^3 + x^4 + \ldots)^4$.

PART – B (5×16=80 Marks)

11. a) i) Prove that the number of vertices of odd degree in a graph is always even. (6)

ii) Prove that a connected graph G is an Euler graph if and only if it can be decomposed into circuits. (10)

(OR)

b) i) Prove that a tree with n vertices has (n – 1) edges. (6)

ii) State and prove Dirac's theorem. (10)

12. a) i) Prove that every circuit has an even number of edges in common with a cut-set. (8)

ii) Prove the following :

With respect to the given spanning tree T, a branch b_i that determines a fundamental cut-set S is contained in every fundamental circuit associated with the chords in S and in no others. (8)

(OR)

b) i) Explain max-flow min-cut theorem. (8)

ii) Define 2-isomorphism and prove that the rank and nullity of a graph are invariant under 2-isomorphism. (8)

13. a) i) If G is a tree with n vertices, then prove that its chromatic polynomial is $P_n(\lambda) = \lambda(\lambda - 1)^{n-1}$. (8)

ii) Define chromatic number. Prove that a graph with at least one edge is 2-chromatic if and only if it has no circuits of odd length. (8)

(OR)

b) i) State and prove five-colour theorem. (8)

ii) Discuss about any four types of digraph with suitable examples. (8)

14. a) i) Using the principle of inclusion and exclusion find the number of prime numbers not exceeding 100. (8)

ii) Show that if n and k are positive integers, then $C(n+1, k) = \frac{n+1}{k} C(n, k-1)$. Use this identity, construct an inductive definition of the binomial co-efficient. (8)

(OR)

b) i) A survey of 150 college students reveals that 83 own cars, 97 own bikes, 28 own motorcycles, 53 own a car and a bike, 14 own a car and motorcycle, 7 own a bike and a motorcycle and 2 own all the three. How many students own a bike and nothing else and how many students do not own any of the three ? (8)

ii) Five professors P_1, P_2, P_3, P_4, P_5 are to be made class advisor for five sections C_1, C_2, C_3, C_4, C_5, one professor for each section. P_1 and P_2 do not wish to become the class advisors for C_1 or C_2, P_3 and P_4 for C_4 or C_5 and P_5 for C_3 or C_4 or C_5. In how many ways can the professors be assigned the work (without displacing any professor) ? (8)

15. a) i) Obtain the fractional de-composition and identify the sequence having the expression $\frac{3-5z}{1-2z-3z^2}$ as a generating function. (8)

ii) Find the generating function of the sequence 7, 8, 9, 10, . . . (4)

iii) Find the number of distinct summands of the integer 6. (4)

(OR)

b) i) Solve the recurrence relation $y_{n+2} - 6y_{n+1} + 8y_n = 3n+5$. (8)

ii) If a_n denotes the sum of the first n positive integers, find a recurrence relation for a_n and then solve it. (8)

Reg. No. : | | | | | | | | | | | | |

Question Paper Code : 52875

B.E./B.Tech. DEGREE EXAMINATIONS, APRIL/MAY 2019.

Seventh/Eighth Semester

Computer Science and Engineering

CS 6702 — GRAPH THEORY AND APPLICATIONS

(Common to Information Technology)

(Regulation 2013)

Time : Three hours Maximum : 100 marks

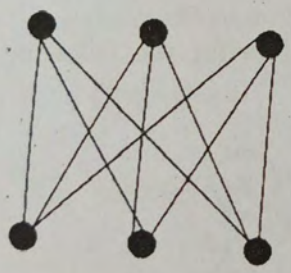
Answer ALL questions.

PART A — (10 × 2 = 20 marks)

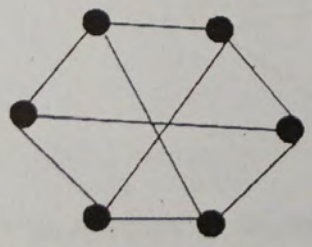
1. Define pendant vertex.

2. Verify that the two graphs (a) and (b) in the following figure are isomorphic. Mention the reasons for it.

(a)



(b)



3. What is meant by edge connectivity?

6. Give an example for transitive relation.

7. In how many ways can the letters of the word APPLE be arranged?

8. In how many ways can a group of 5 men and 2 women be made out of a total of 7 men and 3 women?

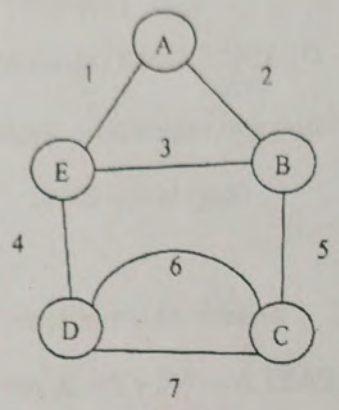
9. Find the generating functions for 1, 1, 1, 1, 1, 1, 0, 0, 0, 0, ...

10. Find a recurrence relation and initial conditions for 1, 5, 17, 53, 161, 485.....

PART B — (5 × 13 = 65 marks)

11. (a) (i) Explain some of the applications of graphs. (7)

(ii) Write down the adjacency and incidence matrices for the following graph. (6)

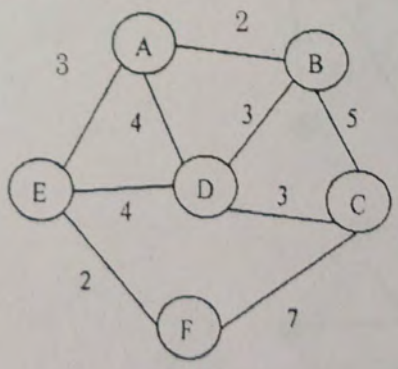


Or

(b) (i) List some of the properties of tree. (7)

(ii) Prove that a connected graph G is an Euler graph iff all vertices of G are of even degree. (6)

12. (a) (i) Find the minimum spanning tree for the following graph using Prim's algorithm. Explain it. (7)



(ii) Prove that the maximum flow in a network is equal to the minimum of capacities of all cut-sets. (6)

Or

(b) (i) Prove that the complete graph of five vertices is non-planar. (6)

(ii) List the properties of cut-set. (7)

13. (a) (i) With example, explain various types of digraphs. (6)

(ii) How will you find all maximal independent sets? Explain. (7)

Or

(b) (i) Why is chromatic polynomial? Explain. (6)

(ii) How is covering of a graph verified? Discuss about it. (7)

14. (a) (i) A box contains three white balls, four black balls and three red balls. Find the number of ways in which three balls can be drawn from the box so that at least one of the balls is black. (5)

(ii) How many ways are there to choose 3 people to receive Rs. 1,000 prize from a group of 9, assuming no one receives more than one prize? (5)

(iii) How many words can be formed by using all letters of the word 'BIHAR'? (3)

Or

(b) (i) In a group of 6 boys and 4 girls, four children are to be selected. In how many different ways can they be selected such that at least one boy should be there? (5)

(ii) How many arrangements can be made out of the letters of the word 'ENGINEERING'? (5)

(iii) In how many ways can three boys be seated on five chairs? (3)

15. (a) Find the coefficient of x^{2005} in the generating function $G(x)$

(i) $G(x) = (1-2x)^{5000}$ (4)

(ii) $G(x) = \frac{1}{1+3x}$ (4)

(iii) $G(x) = \frac{1}{(1+5x)^2}$. (5)

Or

(b) (i) Find the coefficient of x^{60} in $\left(x^8 + x^9 + x^{10} + \ldots\right)^7$. (5)

(ii) Find the recurrence relation for the sequence 3, 7, 11, 15, 19,.... (3)

(iii) Find the unique solution of the recurrence relation (5)

$$6a_n - 7a_{n-1} = 0,\ n \geq 1, a_3 = 343$$

PART C — (1 × 15 = 15 marks)

16. (a) (i) Show that a Hamiltonian path is a spanning tree. (5)

(ii) Prove that in a tree every vertex of degree greater than one is a cut-vertex. (5)

(iii) Prove that a connected planar graph with n vertices and e edges has $e - n + 2$ regions. (5)

Or

(b) (i) Solve the recurrence relation $F_n = 5F_{n-1} - 6F_{n-2}$ where $F_0 = 1$ and $F_1 = 4$. (8)

(ii) Solve the recurrence relation $a_n - 3a_{n-1} = 5(3^n)$ where $n \geq 1$ and $a_0 = 2$. (7)

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Reg. No. : | | | | | | | | | | | | |

Question Paper Code : 71692

B.E./B.Tech. DEGREE EXAMINATION, APRIL/MAY 2017.

Seventh Semester

Computer Science And Engineering

CS 6703 — GRID AND CLOUD COMPUTING

(Common to Information Technology)

(Regulations 2013)

Time : Three hours Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. Tabulate the differences between high performance computing and high throughput computing.

2. Give the basic operations of a VM.

3. What do you understand by the term 'data intensive'?

4. Define "OGSA".

5. Mention the characteristic features of the cloud.

6. Summarize the differences between PaaS and SaaS.

7. Write the significant use of GRAM.

8. Name the different modules in Hadoop framework.

9. What are the various challenges in building the trust environment?

10. Write a brief note on the security requirements of a grid.

PART B — (5 × 16 = 80 marks)

11. (a) Brief the interaction between the GPU and CPU in performing parallel execution of operations. (16)

Or

(b) Illustrate with a neat sketch, the grid computing infrastructure. (16)

12. (a) Write a detailed note on OGSA security models. (16)

Or

(b) Explain how migrations of grid services are handled. (16)

13. (a) Discuss how virtualization is implemented in different layers. (16)

Or

(b) What do you mean by data centre automation using virtualization? (16)

14. (a) Discuss MAPREDUCE with suitable diagrams. (16)

Or

(b) Elaborate HDFS concepts with suitable illustrations. (16)

15. (a) Write detailed note on identity and access management architecture. (16)

Or

(b) Explain grid security infrastructure. (16)

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Reg. No. : | | | | | | | | | | | | |

Question Paper Code : 40919

B.E./B.Tech. DEGREE EXAMINATION, APRIL/MAY 2018
Seventh Semester
Computer Science and Engineering
CS 6703 – GRID AND CLOUD COMPUTING
(Regulations 2013)

Time : Three Hours | Maximum : 100 Marks

Answer ALL questions

PART – A **(10×2=20 Marks)**

1. "Networks are backbones of grid computing" – Justify the statement.
2. Differentiate GRIS with GIIS with an illustration.
3. Justify that Web and Web architecture are SOA based.
4. List the services provided by a grid infrastructure.
5. How does performance enhances by virtualizing the data center ?
6. "Although virtualization is widely accepted today, it does have its limits". Comment on the statement.
7. How does divide-and-conquer strategy relates to MapReduce paradigm ?
8. Brief out the main components of Globus toolkit.
9. On what basis trust models are set for grid environment ?
10. State how CIA Triad plays a vital role in managing cloud security.

PART – B **(5×16=80 Marks)**

11. a) Explain in detail the layered architecture of a grid environment and the functionalities of a grid server.

(OR)

b) Discuss the evolution path of cloud computing. Also, express the difference between grid and distributed computing.

12. a) Explain in detail the OGSA security architecture and its security services.

(OR)

b) What is the purpose of OGSI ? Describe the ports and interfaces defined in OGSI along with its inheritance hierarchy.

13. a) With architecture, elaborate the various deployment models and reference models of cloud computing.

(OR)

b) "Virtualization is the wave of the future". Justify. Explicate the process of CPU, memory and I/O device virtualization in data center.

14. a) List the characteristics of Globus tool kit. With a neat sketch describe the architecture of Globus GT4 and the services offered.

(OR)

b) With an illustration, emphasize the significance of MapReduce paradigm in Hadoop framework. List out the assumptions and goals set in HDFS architecture for processing the data based on divide-and-conquer strategy.

15. a) "In today's world, infrastructure security and data security is highly challenging at network, host and application levels". Justify and explain the several ways of protecting the data at transit and at rest.

(OR)

b) Explain the baseline Identity and Access Management (IAM) factors to be practised by the stakeholders of cloud services and the common key privacy issues likely to happen in the environment.

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Reg. No. : | | | | | | | | | | | | |

Question Paper Code : 50401

B.E./B.Tech. DEGREE EXAMINATION, NOVEMBER/DECEMBER 2017

Seventh Semester

Computer Science and Engineering

CS 6703-GRID AND CLOUD COMPUTING

(Common to : Information Technology)

(Regulations 2013)

me : Three Hours | Maximum : 100 Marks

Answer ALL questions

PART – A **(10×2=20 Marks)**

1. "Grid inherits features of P2P and cluster computing systems". Is the statement true ? Validate your answer.
2. Differentiate between grid and cloud computing.
3. Compare GSH with GSR.
4. What is the purpose of grid service description ?
5. List the requirements of VMM.
6. Distinguish between physical and virtual clusters.
7. "HDFS is fault tolerant. Is it true ? Justify your answer.
8. What is the purpose of heart beat in hadoop ?
9. List any four host security threats in public laaS.
0. Identify the trust model based on a site's trust worthiness.

PART – B **(5×16=80 Marks)**

. a) i) Describe the infrastructure requirements for grid computing.

ii) What are the issues in cluster design ? How can they be resolved ?

(OR)

b) i) Describe layered grid architecture. How does it map onto internet protocol architecture ?

ii) Describe the architecture of a cluster with suitable illustrations.

12. a) "Data produced by a large Hadron Collider may exceed several petabyts". What type of grid service model(s) will you suggest for such an application ? Illustrate with diagrams.

(OR)

b) What is OGSA ? Explain open grid services architecture in detail with the functionalities of the components.

13. a) Describe service and deployment models of a cloud computing environment with illustrations. How do they fit in NIST cloud architecture ?

(OR)

b) What is virtualisation ? Describe para and full virtualisation architectures. Compare and contrast them.

14. a) Illustrate dataflow in HDFS during file read/write operation with suitable diagrams.

(OR)

b) What is GT4 ? Describe in detail the components of GT4 with a suitable diagram.

15. a) What is the purpose of GSI ? Describe the functionality of various layers in GSI.

(OR)

b) What is the purpose of IAM ? Describe its functional architecture with an illustration.

Reg. No. : | | | | | | | | | | | | |

Question Paper Code : 20377

B.E./B.Tech. DEGREE EXAMINATION, NOVEMBER/DECEMBER 2018.

Seventh Semester

Computer Science and Engineering

CS 6703 — GRID AND CLOUD COMPUTING

(Common to Information Technology)

(Regulations 2013)

(Also common to PTCS 6703 – Grid and Cloud Computing for B.E. (Part-Time) – Sixth Semester – Computer Science and Engineering – Regulations (2014))

Time : Three hours Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. Outline any two advantages of distributed computing.

2. What is service oriented architecture?

3. Define the term Web service.

4. What is a data grid?

5. Write a short note on community cloud.

6. Define the term virtual cluster.

7. What is distributed file system?

8. How MapReduce framework executes user jobs?

9. Write a short note on Kerberos.

10. What is identity and access management in a cloud environment?

PART B — (5 × 13 = 65 marks)

11. (a) (i) Outline the architecture of a cluster of cooperative computers with a diagram. (7)

(ii) Outline the similarities and differences between distributed computing, grid computing and cloud computing. (6)

Or

(b) What is grid computing? Draw a typical view of a grid environment and outline the key elements of grid. (13)

12. (a) What is open grid services architecture? Present a detailed view of open grid services architecture. (13)

Or

(b) What is open grid services infrastructure? Outline the open grid services infrastructure with a diagram. (13)

13. (a) (i) What are the pros and cons for public, private and hybrid cloud (7)

(ii) Explain virtualization of I/O devices with an example. (6)

Or

(b) What is a data center? Outline the issues to be addressed with respect to virtualization for data center automation. (13)

14. (a) Explain the main components and programming model of Globus Toolkit. (13)

Or

(b) Explain the Hadoop distributed file system architecture with a diagram. (13)

15. (a) Define authentication and authorization. Outline authentication and authorization in grids with relevant examples. (13)

Or

(b) Describe Infrastructure-as-a Service (IaaS), Platform-as-a Service (PaaS) and Software-as-a Service (SaaS) with an example. (13)

PART C — (1 × 15 = 15 marks)

16. (a) Elaborate a hybrid trust model for grid security enforcement. (15)

Or

(b) Describe a framework for building a web service with Globus Toolkit. (15)

Reg. No. :

Question Paper Code : 91411

B.E./B.Tech. DEGREE EXAMINATIONS, NOVEMBER/DECEMBER 2019

Seventh/Sixth Semester

Computer Science and Engineering

CS 6703 – GRID AND CLOUD COMPUTING

(Common to Information Technology)

(Regulations 2013)

(Also Common to PTCS 6703 – Grid and Cloud Computing for B.E. Part-Time – Sixth Semester Computer Science and Engineering – Regulations 2014)

Time : Three Hours

Maximum : 100 Marks

Answer ALL questions

PART – A

(10×2=20 Marks)

1. Define Grid computing.
2. What is the impact of SOA in cloud ?
3. What are the requirements for the web services based on OGSI ?
4. What is the need for data intensive grid service models ?
5. List the pros and cons of cloud computing.
6. Give the significance of virtualization for data center automation.
7. What is the usage of Globus ?
8. State the significance of heart beat message in Hadoop.
9. Differentiate between authentication and authorization.
10. List out the key privacy issues in cloud.

PART – B

(5×13=65 Marks)

11. a) Illustrate the evolution of distributed computing to grid and cloud computing.

(OR)

b) Describe the grid architecture.

12. a) Illustrate the detailed view of OGSA/OGSI.

(OR)

b) Explain about the OGSA services.

13. a) Illustrate the cloud delivery models in detail.

(OR)

b) Illustrate the design of a large-scale virtual cluster system.

14. a) Explain the Globus toolkit architecture.

(OR)

b) Illustrate the design of Hadoop file system.

15. a) Explain the grid and cloud security infrastructure.

(OR)

b) Describe the IAM practices in Saas, PaaS and IaaS availability in cloud.

PART – C **(1×15=15 Marks)**

16. a) Compare and contrast the cloud deployment models.

(OR)

b) Analyze how MapReduce framework supports parallel and distributed computing on large data sets with a suitable example.

Reg. No. : | | | | | | | | | | | | |

Question Paper Code : 71657

B.E./B.Tech. DEGREE EXAMINATION, APRIL/MAY 2017.

Seventh/Eighth Semester

Computer Science and Engineering

CS 6004 — CYBER FORENSICS

(Common to Information Technology)

(Regulations 2013)

Time : Three hours | Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. Draw the IPsec Authentication Header and List the fields.
2. State compression and decompression using SSL Reco protocol.
3. Suppose the string of octets [0008 02fe] forms an MPI. The length of the MPI in bits [00000000 00001001] or 9 (= 23 + 20) in octets. Identify the actual integer value of the MPI.
4. List the types and importance of firewalls.
5. Define 'Hacking'.
6. Discuss RAID Data acquisition.
7. Label any three types of field kit to be used in crime scene.
8. Classify and compare hardware and software Forensic tools.
9. Name any three standard procedures used in Network Forensics.
10. Decide the roles of Client and Servers in E-mail investigations.

PART B — (5 × 16 = 80 marks)

11. (a) Illustrate briefly and compute the HMAC-SHA-1 and HMAC-MD5 using RFC Method and alternative method in IPsec security. (16)

Data 0 × 7104f218 a3192f65 1ef7225d 7011bf79 4a19

Key : 0 × 31fa7062 a45113e3 2679fd13 53b71264

Or

(b) Design a Pseudo Random Function (PRF) generation scheme using the parameters (16)

Seed : 0× 80 af 12 5c 7e 36 f3 21

label = rocky mountains = 0× 82 6f 63 6b 69 20 6d 6e 75 6f 74 61 69 6e 73

secret = 0× 35 79 bf 12 c4

12. (a) (i) Explain in detail the basic concept of Confidentiality vs. Encryption with the computational scheme. (8)

(ii) Convert the encoding process from 8-bit input groups to character string using Radix-64 alphabet.

Input raw text : 0× 15 d0 2f 9e b7 4c (4)

Input raw text : 0× 14 f2 d2 87 c2 2b. (4)

Or

(b) Compute the dual signature and perform merchant's and Banker's verification for the given Order Message(OM) and Payment Message(PM)

Order Message (OM) = 315a46f51283e7c647

Payment Message (PM) = 1325e46568. (16)

13. (a) Discuss in detail the systematic approach in computer investigations and conducting an Investigation in Computer Organizations. (16)

Or

(b) Discuss the investigation of Employee termination case, Internet abuse investigation, Attorney Client Privilege investigation in corporate high tech investigation. (16)

14. (a) Explain in detail about how the understanding NTFA, FAT, FAT32 file system plays a Crucial role in cyber forensic. (16)

Or

(b) Explain briefly the RAID architecture and its types with the data acquisition structure. Also explain the data centers used in processing the RAID systems. (16)

15. (a) (i) Discuss the procedure to validate the hexadecimal editors. (8)

(ii) Briefly explain any one steganography algorithm to hide data in a image. (8)

Or

(b) Examine and list the procedure to analyze the UNIX and Microsoft E-mail server logs. (16)

Reg. No. : | | | | | | | | | | | | |

Question Paper Code : 40884

B.E./B.Tech. DEGREE EXAMINATION, APRIL/MAY 2018
Seventh/Eighth Semester
Computer Science and Engineering
CS 6004 – CYBER FORENSICS
(Common to Information Technology)
(Regulations 2013)

Time : Three Hours | Maximum : 100 Marks

Answer ALL questions

PART – A (10×2=20 Marks)

1. Bring out any two difference between Http and Https protocol.
2. Define SSL session and SSL connection.
3. How PGP provides confidentiality ?
4. What is a proxy server ?
5. Define identity fraud.
6. What is e-mail abuse ?
7. When you delete a image/audio/video, do you really delete it ? Is it possible to revert the deleted data ?
8. What is a virtual machine ?
9. What is steganography ?
10. Give examples for e-mail forensics tools.

PART – B (5×16=80 Marks)

11. a) i) Outline the basic components of the IPSec security architecture. (4)
ii) Explain the OAKLEY key determination protocol. (12)

(OR)

b) Explain with a diagram the overall operation of the Secure Sockets Layer (SSL) record protocol. (16)

12. a) What is a firewall ? Explain with a diagram a screened host firewall which uses a single-homed bastion host, a screened host firewall which uses a dual-homed bastion host and a screened subnet firewall. **(16)**

(OR)

b) What is Secure Electronic Transaction (SET) ? Explain the business requirements for SET and outline the SET system participants. **(16)**

13. a) Outline the problems and challenges forensic examiners face when preparing and processing investigations, including the ideas and questions they must consider. **(16)**

(OR)

b) Explain the process of acquiring data with a Linux Boot CD. **(16)**

14. a) Outline the process of preparing to acquire digital evidence, processing an incident or crime scene and processing data centers with RAID systems. **(16)**

(OR)

b) Explain the following : NTFS data streams, NTFS compressed files and NTFS encrypting file system. **(16)**

15. a) Explain the process of investigating e-mail crimes and violation. **(16)**

(OR)

b) Appraise the acquisition procedures for cell phones and mobile devices. **(16)**

Reg. No. : | | | | | | | | | | | | |

Question Paper Code : 50403

B.E./B.Tech. DEGREE EXAMINATION, NOVEMBER/DECEMBER 2017
Eighth Semester
Computer Science and Engineering
CS 6801 – MULTI-CORE ARCHITECTURES AND PROGRAMMING
(Regulations 2013)

Time : Three Hours

Maximum : 100 Marks

Answer ALL questions

PART – A

(10×2=20 Marks)

1. Differentiate symmetric memory architecture and distributed memory architecture.
2. What are multiprocessor systems and give their advantages.
3. What are conditions under which a deadlock situation may arise ?
4. Define thread. Mention the use of swapping.
5. Define message queue.
6. What is termed as initial task region ?
7. List the restrictions to work sharing constructs.
8. Write the performance evaluation methods is distributed memory programming.
9. What is race condition ?
10. What are the features of distributed memory ?

PART – B

(5×16=80 Marks)

11. a) Explain in detail , the SIMD and MIMD systems. Discuss briefly the performance issues of multi-core processors.

(OR)

b) Define Cache Coherence Problem. What are the 2 main approaches to cache coherence ? Describe working of snooping cache coherence and explain describe directory based coherence.

12. a) Explain the various approaches to Parallel Programming.

(OR)

b) What is a data race ? What are the tools used for detecting data races ? How to avoid data races ?

13. a) Illustrate an OpenMP execution model with an example.

(OR)

b) Explain in detail about the handling loops in parallel operations.

14. a) What is MPI ? Write a program "hello, world" that makes some use of MPI. How to compile and execute MPI programs ?

(OR)

b) Differentiate collective and point-to-point communication and draw the architecture for tree structured communication.

15. a) What does the n-body problem do ? Give the pseudocode for serial n-body solver and for computing n-body forces.

(OR)

b) How will you parallelize the reduced solver using OpenMP ? How will you parallelize the reduced solver using OpenMP ?

Reg. No. : | | | | | | | | | | | | |

Question Paper Code : 20379

B.E./B.Tech. DEGREE EXAMINATION, NOVEMBER/DECEMBER 2018.

Eighth Semester

Computer Science and Engineering

CS 6801 – MULTI-CORE ARCHITECTURES AND PROGRAMMING

(Regulations 2013)

(Common to PTCS 6801 – Multi-Core Architectures and Programming for B.E. (Part-Time) – Computer Science and Engineering – Regulations 2014)

Time : Three hours Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. State Amdahl's law.
2. What is symmetric shared memory?
3. List down the various synchronization primitives in parallel programming.
4. Compare deadlock and livelock in terms of resource reservation.
5. State the trapezoidal rule in OpenMP.
6. What are loop-carried dependencies?
7. Write a note on distributed memory machines.
8. How to compile an MPI program?
9. Name any two OpenMP environment variables.
10. List any two data scoping clauses in OpenMP.

PART B — (5 × 16 = 80 marks)

11. (a) (i) Outline the distributed shared-memory architecture with a diagram. (8)

(ii) Present an outline of parallel program design. (8)

Or

(b) Highlight the limitations of single core processors and outline how multicore architectures overcome these limitations. (16)

12. (a) What is deadlock? Explain the four conditions for deadlock and present an example for deadlock in a parallel computing environment. (16)

Or

(b) (i) Outline the critical section problem with an example. (6)

(ii) Explain how semaphores can be used to accomplish mutual exclusion of parallel-process synchronization with an example. (10)

13. (a) (i) Outline the OpenMp execution model. (8)

(ii) Discuss about OpenMp directives with relevant examples. (8)

Or

(b) (i) What is loop-carried dependence? Explain with an example. (8)

(ii) Outline with an example the use of the greatest common divisor test to determine whether dependences exist in a loop. (8)

14. (a) Explain the structure of an MPI program with an example. (16)

Or

(b) (i) Outline collective vs point-to-point communications in MPI with an example. (8)

(ii) What is a MPI derived data type? How to create a MPI derived data type? Give any two examples. (8)

15. (a) Outline the process of parallelizing depth-first search algorithm using OpenMP with an example. (16)

Or

(b) Write a note on thread paradigm and compare OpenMP and MPI programming models. (16)

Reg. No. : | | | | | | | | | | | | |

Question Paper Code : 71694

B.E./B.Tech. DEGREE EXAMINATION, APRIL/MAY 2017.

Eighth Semester

Computer Science and Engineering

CS 6801 — MULTI-CORE ARCHITECTURES AND PROGRAMMING

(Regulations 2013)

Time : Three hours Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. Define Vector instructions.

2. What do you snooping cache coherence?

3. What is data sharing?

4. Difference between deadlocks and livelocks.

5. Write a "hello,world" program that uses OpenMP.

6. Define Odd-even transposition sort.

7. What is a wrapper script?

8. What are the possibilities for choosing a destination when sending requests for work with MPI?

9. Define NP-complete problem.

10. Write a Pseudocode for a recursive solution to TSP using depth-first search.

PART B — (5 × 16 = 80 marks)

11. (a) Explain in detail about interconnection networks.

Or

(b) (i) Write a short notes about MIMD system. (8)

(ii) Explain parallel program design with an example. (8)

12. (a) Explain the data races and scalability in parallel program.

Or

(b) Explain in detail about the synchronization primitives in parallel program challenges.

13. (a) Explain OpenMP directives.

Or

(b) How data and functional parallelism are handled in shared memory programming with openMP?

14. (a) (i) Explain tree structured communication. (8)

(ii) What are the differences between point to point and collective communication? (8)

Or

(b) (i) Explain the performance evaluation of MPI programs. (8)

(ii) What are the performance issues in multi core processors? (8)

15. (a) (i) How to parallelize the basic solver using MPI? (8)

(ii) Explain Non-recursive depth-first search. (8)

Or

(b) Explain the implementation of tree search Using MPI and dynamic partitioning.

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Reg. No. : | | | | | | | | | | | | |

Question Paper Code : 40921

B.E./B.Tech. DEGREE EXAMINATION, APRIL/MAY 2018
Eighth Semester
Computer Science and Engineering
CS 6801 – MULTI-CORE ARCHITECTURES AND PROGRAMMING
(Regulations 2013)

Time : Three Hours | Maximum : 100 Marks

Answer ALL questions

PART – A (10×2=20 Marks)

1. Define the symmetric shared memory.
2. List the pros and cons of distributed memory.
3. Write down the performance metrics.
4. Define mutex lock and spin lock.
5. Explain scope of a variable.
6. Define Race Condition.
7. Give the commands for MPI.
8. Define Broadcast and butterfly MPI.
9. How to compute n-body forces ?
10. List the data structures used for the serial implementations.

PART – B (5×16=80 Marks)

11. a) i) State and explain Amdahl's law in detail. (8)

ii) Outline the steps in Designing and Building Parallel Programs. Give example. (8)

(OR)

b) Elaborate the classification of computer architecture used in parallel computing system.

12. a) i) Discuss in detail about producer-consumer synchronization. (8)

ii) Write a simple semaphore to sent a message. (8)

(OR)

b) i) List out the approaches and tools for detecting data races. (8)

ii) Write a short notes on deadlocks, livelocks and named pipes. (8)

13. a) Elaborate OpenMP execution model and memory model in detail.

(OR)

b) Write an example program for shared memory programming with pthread.

14. a) i) Explain loop handling in detail. (8)

ii) Describe about MPI Program execution with example. (8)

(OR)

b) Explain the Virtual memory in detail.

15. a) i) Describe collective vs. point to point communication. (8)

ii) Describe the Parallelizing the tree-search program using OpenMP. (8)

(OR)

b) Explain about tree search with Pseudo-code for a recursive solution to TSP using depth-first search.

Reg. No. : | | | | | | | | | | | | |

Question Paper Code : 52878

B.E./B.Tech. DEGREE EXAMINATIONS, APRIL/MAY 2019.

Eighth/Seventh Semester

Computer Science and Engineering

CS 6801 — MULTI-CORE ARCHITECTURES AND PROGRAMMING

(Regulation 2013)

(Common to: PTCS 6801 – Multi-Core Architectures and Programming for B.E. (Part – Time) for seventh semester – Computer Science and Engineering – Regulation 2014)

Time : Three hours

Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. What is the purpose of multi-core integrated circuits?
2. List of problems considering the increases in performance of multi core architectures.
3. How to avoid data races?
4. Define Critical Region.
5. What is the extension to distributed memory?
6. Define Von Neumann Architecture.
7. How OpenMP programs are compiled and executed?
8. What does the distributed memory consist of in MIMD?
9. Give the List of MPI Functions.
10. Define MPI Derived Data Types.

PART B — (5 × 13 = 65 marks)

11. (a) Discuss in detail about the Interconnection networks.

Or

(b) Discuss in detail about the single and multi core architectures.

12. (a) Explain the Code for shared memory using Pthreads.

Or

(b) Explain the Code of message passing systems using MPI.

13. (a) Explain the Issues in Shared Memory Systems.

Or

(b) Explain in detail about the pseudocode for recursive solution and non recursive solution to TSP using depth first search.

14. (a) How can we decide which API, MPI, Pthreads, or OpenMP is best for our application?

Or

(b) Differentiate Collective and Point-to-Point Communication and Draw the architecture for tree structured Communication.

15. (a) Explain in detail about Patterns for parallel programming and OPL.

Or

(b) Explain in detail about the Challenges to Parallel Programming.

PART C — (1 × 15 = 15 marks)

16. (a) Explain with program for point-to-point communication and collective communication.

Or

(b) Write the tree search program both in OpenMp and MPI.

AN only

Reg. No. : | | | | | | | | | | | | |

Question Paper Code : 91382

B.E./B.Tech. DEGREE EXAMINATIONS, NOVEMBER/DECEMBER 2019

Eighth Semester

Computer Science and Engineering

CS6010 – SOCIAL NETWORK ANALYSIS

(Common to Information Technology)

(Regulations 2013)

Also Common to : PTCS6010 – Social Network Analysis for B.E. (Part-Time) Seventh Semester – Computer Science and Engineering (Regulations – 2014)

Time : Three Hours | Maximum : 100 Marks

Answer ALL questions

PART – A **(10×2=20 Marks)**

1. What is Network analysis ?
2. Differentiate Web and Semantic web.
3. What is OWL ?
4. List the key problems in aggregating social network data ?
5. What is Web content mining ?
6. Define: Web community.
7. What is meant by Context ?
8. What is meant by trust network ?
9. What is the use of adjacency matrix representation ?
10. What is clustering coefficient ?

PART – B **(5×13=65 Marks)**

11. a) Discuss key concepts and measures in network analysis.

(OR)

b) What is the need of semantic web ? Explain with example.

12. a) Explain the unique features of RDF.

(OR)

b) What is FOAF ontology ? Explain its usage to represent personal information with an example.

13. a) Discuss metrics to be used in evaluating communities.

(OR)

b) Give an application of community mining algorithms with details.

14. a) Explain the steps used for enabling human behavior understanding and prediction.

(OR)

b) Describe the subjective based trust models.

15. a) Discuss the advantage hybrid representations in visualizing social networks.

(OR)

b) What are the aspects in which social network is analyzed in digital libraries ?

PART – C **(1×15=15 Marks)**

16. a) Explain the tools involved in developing and detecting social network communities in detail.

(OR)

b) Describe the applications of social network analysis in detail. **(8)**

Explain the techniques involved in Reasoning Social network data. **(7)**

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Question Paper Code : 52847

B.E./B.Tech. DEGREE EXAMINATIONS, APRIL/MAY 2019.

Eighth Semester

Computer Science and Engineering

CS 6010 — SOCIAL NETWORK ANALYSIS

(Common to Information Technology)

(Regulation 2013)

(Also common to PTCS 6010 – Social Network Analysis for B.E (Part Time) – Seventh Semester – Computer Science and Engineering – Regulations 2014)

Time : Three hours Maximum : 100 marks

(Codes / Tables / Charts to be permitted, if any may be indicated)

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. Why is the sematic web developed?

2. Define Social Network Analysis.

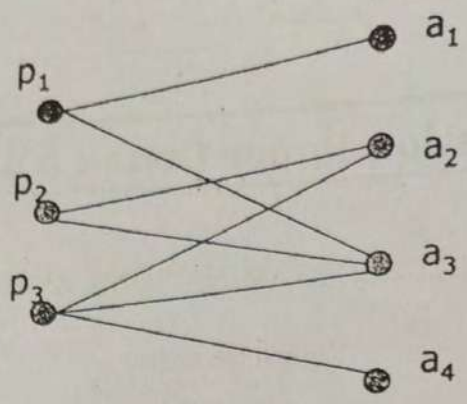
3. What is the significance of a bridge in social networks?

4. F.van Harmelen is the author of the book A Semantic Web Primer. The email address of Frank van Harmelen is frankh@cs.vu.nl. A person sent an email from frankh@cs.vu.nl to pmika@cs.vu.nl. If person A sends an email to person B, they know each other. What do you conclude from the above?

5. How is the overlapping community structure determined using CPM (Clique Percolation Method)?

6. How is the community detected using Girvan Newmann method?

7. Consider the affiliation graph in Figure 1. How do you represent this graphically?



8. Define betweeness in social network.

9. Define robustness in social networks.

10. When does uncertainty occur in a social network?

PART B — (5 × 13 = 65 marks)

11. (a) How is the social relations among people extracted from the web pages?

Or

(b) How are blogs analyzed with the trend analysis with the intention of network marketing?

12. (a) How is the social network represented in an ontological fashion?

Or

(b) Compare description logic and rule based reasoning in semantic web and social networks.

13. (a) How can you detect communities in social networks?

Or

(b) How can you discover scientific collaboration groups in social networks?

14. (a) Explain how trust transitivity analysis is achieved in social networks?

Or

(b) How will you classify privacy and security issues in online social networks?

15. (a) How is the visualization of the associations between research topics within the Semantic Web community done? (13)

Or

(b) What are the different metrics used in Social Networks Analysis? (13)

PART C — (1 × 15 = 15 marks)

16. (a) The site theyrule.net visualizes the interconnectedness of the American political, business and media elite by showing connections between executive boards of various institutions and their board members. Connections between individuals can be inferred by the boards in which they co-participate. On what parameters do you analyze the social network? Justify. (15)

Or

(b) Assume there exists a co-author network. How can the community be mined from co-author network? (15)

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Question Paper Code : 20852

B.E./B.Tech. DEGREE EXAMINATION, NOVEMBER/DECEMBER 2018.

Seventh/Eighth Semester

Computer Science and Engineering

MG 6088 — SOFTWARE PROJECT MANAGEMENT

(Common to Electronics and Communication Engineering/Industrial Engineering/ Mechatronics Engineering/Information Technology)

(Regulations 2013)

(Also Common to : PTMG 6088 – Software Project Management for B.E. (Part-Time) Sixth Semester – Computer Science and Engineering – Regulations 2014)

Time : Three hours Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. What are the steps in cost-benefit analysis?

2. Define the term management control.

3. What is SCRUM?

4. Expand RAD. Is it incremental model? Justify.

5. Distinguish between Forward pass and back pass techniques.

6. Give the need for Monte Carlo simulation.

7. How do Earned value management helps project Manager?

8. What is Contract management?

9. Define the term virtual team.

10. What is the role of Ethics in project Management?

PART B — (5 × 13 = 65 marks)

11. (a) How does Project Management Methodology differ for simple projects and complex projects? Explain in detail.

Or

(b) List the types of critical risks in project planning.

12. (a) How the cost-estimation of Agile projects are done? Explain in detail.

Or

(b) Explain estimation through COCOMO II model.

13. (a) Discuss the phases of risk monitoring measure.

Or

(b) What is CPM? List its types and explain.

14. (a) Give the need for EVA. Is it necessary for WBS for EVA? Justify with measure progress.

Or

(b) With neat diagram bring the importance of Software Configuration Management (SCM).

15. (a) Do staff selection relate with Quality of product? Justify with appropriate reason.

Or

(b) What are two types of Decision-making? Discuss on rational Decision making approach.

PART C — (1 × 15 = 15 marks)

16. (a) For software project, draw an activity chart with task dependency table. Derive Critical path for completion of the project. Based on Task dependency diagram allocate resource and derive Activity chart.

Or

(b) What are the functions in traffic light-Controller method? With the help of Software project management, how will you solve the problem?

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Reg. No. : | | | | | | | | | | | | | |

Question Paper Code : 91883

B.E./B.Tech. DEGREE EXAMINATIONS, NOVEMBER/DECEMBER 2019

Seventh/Eighth Semester

Computer Science and Engineering

MG6088 – SOFTWARE PROJECT MANAGEMENT

(Common to : Electronics and Communication Engineering/Industrial Engineering/Mechatronics Engineering/Information Technology)

(Regulations 2013)

(Also Common to : PTMG6088 – Software Project Management for B.E. (Part-Time) Sixth Semester – Computer Science and Engineering – Regulations 2014)

Time : Three Hours | Maximum : 100 Marks

Answer ALL questions

PART – A (10×2=20 Marks)

1. Outline the need for feasibility study.
2. Define risk.
3. Give example for rapid application development.
4. What is SCRUM ?
5. State the objectives of activity planning.
6. Name the three time estimates PERT includes.
7. Define change control.
8. What is outsourcing ?
9. Define a team.
10. What is ethics ?

PART – B (5×13=65 Marks)

11. a) What is software project management ? Outline the activities involved in software project management. (13)

(OR)

b) Explain the stepwise project planning activities with a diagram. (13)

12. a) Outline the spiral software development life cycle model with a diagram. What are strengths of the spiral model ? What are the deficiencies of the spiral model ? When to use the spiral model ? (13)

(OR)

b) Present an outline of the COCOMO II software cost estimation model. (13)

13. a) Explain the various ways of risk identification and risk assessment. (13)

(OR)

b) Explain the critical path method with an example. (13)

14. a) i) What is earned value analysis ? Explain with an example. (6)

ii) Discuss the various ways of visualizing the project progress. (7)

(OR)

b) What is software configuration management ? Outline the activities involved in software configuration management. (13)

15. a) What is a virtual team ? Discuss how to successfully build and manage a virtual team. (13)

(OR)

b) Present an outline of Hackman and Oldham's job characteristics model. (13)

PART – C (1×15=15 Marks)

16. a) Draw the critical path diagram for the tabulated activities. Identify critical path and the duration of the project.

Activity	Duration (days)	Immediate Predecessor
A	9	–
B	10	–
C	9	A
D	15	B, C
E	12	B
F	4	D
G	8	E
H	10	F, G

(OR)

b) For the online bus ticket reservation system project,

1) Estimate the cost using COCOMO model.
2) What are the risks involved ?
3) Draw the Gantt chart for the project.

Reg. No. :

Question Paper Code : 41453

B.E./B.Tech. DEGREE EXAMINATION, APRIL/MAY 2018
Seventh / Eighth Semester
Industrial Engineering
MG6088 – SOFTWARE PROJECT MANAGEMENT
(Common to : Computer Science and Engineering /Electronics and Communication Engineering/Mechatronics Engineering /Information Technology)
(Regulations 2013)

Time : Three Hours | Maximum : 100 Marks

Answer ALL questions

PART – A (10×2=20 Marks)

1. What is the need of Software Project Management ?
2. Define software quality metrics.
3. What is SCRUM ?
4. Brief about two ways of setting objectives.
5. Define Monitoring.
6. What is Monte Carlo simulation method ?
7. How to Visualize Progress ?
8. Distinguish between Earned Value Analysis and Earned Value Management.
9. Define virtual team.
10. What is the role of Ethics in project Management ?

PART – B (5×16=80 Marks)

11. a) Outline on Management Objectives and Priorities.

(OR)

b) i) What is Risk ? Discuss about Risk Management process.

ii) List out various paradigms, principles to manage the risks in project.

12. a) i) Explain the steps involved for Extreme Programming.

ii) List all its advantages and disadvantages.

(OR)

b) What are the Components of Staffing ? Explain the methods of Staffing level estimation.

13. a) What is a critical path Method ? Discuss CPM with activity bar chart.

(OR)

b) In what way project evaluation and review technique can be represented through activity network ? Explain.

14. a) Who is responsible for Project Tracking ? Brief the different ways to track a project.

(OR)

b) Discuss in detail the types of contracts with its checklist.

15. a) Explain Hackman and Oldham job characteristics model.

(OR)

b) How to deal with Ethical and Programming Concerns in software project Management ?

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Reg. No. : | | | | | | | | | - | | | | |

Question Paper Code : 20346

B.E./B.Tech. DEGREE EXAMINATION, NOVEMBER/DECEMBER 2018.

Eighth Semester

Computer Science and Engineering

CS 6008 — HUMAN COMPUTER INTERACTION

(Common to Information Technology)

(Regulation 2013)

(Also common to PTCS 6008 – Human Computer Interaction for B.E. (Part time) – Seventh Semester Computer Science and Engineering Regulation 2014)

Time : Three hours Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. What is directive reasoning?
2. List the factors that can limit the speed of an interactive system.
3. Identify the steps involved in interaction design process.
4. Write down the techniques used for prototyping.
5. What is Task-Action Grammar (TAG)?
6. Compare the primary and secondary stack holders.
7. Give some examples of World's largest mobile operators.
8. Define color palette.
9. List any four principles of designing rich web interface.
10. What do you mean by inlay?

PART B — (5 × 16 = 80 marks)

11. (a) (i) Explain the framework of Human Computer Interaction. (10)

(ii) Highlight the features of direct manipulation interface. (6)

Or

(b) (i) Discuss the technologies involved in display devices. (8)

(ii) Brief about common interface styles used in interactive system. (8)

12. (a) (i) Explain the visual tools available for screen design and layout. (8)

(ii) Outline the activities involved in waterfall model of software life cycle. (8)

Or

(b) (i) List and explain the factors that influence for choosing an evaluation method. (8)

(ii) Enumerate Norman's seven principles for transferring difficult task to simple one in design. (8)

13. (a) (i) Explain the concept of key stake level model. (8)

(ii) Describe the stages of Open System Task analysis (OSTA). (8)

Or

(b) (i) What are the four types of textual communication? Explain. (8)

(ii) Write note on Dynamic web content. (8)

14. (a) (i) Describe the roles of major mobile operating system. (8)

(ii) Tabulate the various mobile design tools and interface tool kits. (8)

Or

(b) Elaborate on Mobile application medium types. (16)

15. (a) (i) Write notes on contextual tools. (8)

(ii) Brief about the different types of overlays. (8)

Or

(b) Explain the steps involved in designing a web interface. (16)

Reg. No. : | | | | | | | | | | | | |

Question Paper Code : 71661

B.E./B.Tech. DEGREE EXAMINATION, APRIL/MAY 2017.

Eighth Semester

Computer Science and Engineering

CS 6008 — HUMAN COMPUTER INTERACTION

(Common to Information Technology)

(Regulations 2013)

Time : Three hours Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. Define reasoning. List its types.

2. What is Ergonomics?

3. Define prototyping.

4. What do you mean by universal design?

5. List out the types of textual communication.

6. Highlight the applications of hypermedia.

7. Identify the categories of mobile platforms.

8. Give examples of Mobile design tools.

9. What is auto complete pattern?

10. What are the types of overlays?

PART B — (5 × 16 = 80 marks)

11. (a) (i) Explain the model of the structure of human memory with diagrammatic illustration. (10)

(ii) Outline the factors that can limit the speed of an interactive computer system. (6)

Or

(b) (i) List and explain the stages of Norman's model of interaction. (8)

(ii) Outline the common interface styles used in interactive system. (8)

12. (a) With a neat sketch, explain the interaction design process in. (16)

Or

(b) (i) Narrate the Shneiderman's eight golden rules of Interface Design. (8)

(ii) Outline the approaches used for evaluation through expert analysis. (8)

13. (a) What is a cognitive model? Classify cognitive models and discuss the same. (16)

Or

(b) (i) Who is a stakeholder? Outline the types of stake holders and appraise the stakeholders for an airline booking system. (8)

(ii) Explain the stages involved in CUSTOM methodology analysis. (8)

14. (a) Appraise the types of mobile applications with examples. (16)

Or

(b) List and explain the elements of mobile design. (16)

15. (a) Summarize the principles for designing rich web interface. (16)

Or

(b) Design a web interface for a "Library Management System". State the functional requirements you are considering.
