

1261/A21

MAY 2008

DISCRETE MATHEMATICS

Time : Three hours

Maximum : 100 marks

PART A — (6 × 5 = 30 marks)

Answer any SIX questions.

1. Given an example of a relation which is neither reflexive nor irreflexive.
2. Prove that the equality of numbers on a set of real numbers is an equivalence.
3. Draw truth table for the five basic connectives.
4. Differentiate tautology and contradiction.
5. Obtain the recurrence relation whose solution is  $D(k) = 5.2^k$ .
6. What are the properties of a generating functions?
7. Define the terms simple, complete and regular graph with example.
8. Define isomorphism of two graphs with suitable graphs.

9. Write the properties of the operations meet and join.

10. Find atoms in the Boolean algebra of all positive divisors of 70.

PART B — (4 × 10 = 40 marks)

Answer any FOUR questions.

11. Let  $R = \{(1, 2), (3, 4), (2, 2)\}$  and  $S = \{(4, 2), (2, 5), (3, 1), (3, 1)\}$  find  $R \circ S, S \circ R, R \circ R$  and  $S \circ S$ .

12. If  $f: A \rightarrow B$  and  $g: B \rightarrow C$  be bijective prove that  $(g \circ f)^{-1} = f^{-1} \circ g^{-1}$ .

13. Solve the recurrence relation  $a(n) = a(n-1) + 2(n-1)$  with boundary condition  $a(1) = 2$ .

14. Prove that a tree with  $n$  vertices has  $n - 1$  edges.

15. Prove that, in a simple graph, the number of odd degree vertices is always even.

16. State and prove the De Morgan's law for a complemented distributive Lattice.

PART C — (2 × 15 = 30 marks)

Answer any TWO questions.

17. Prove

$$(a) \quad P \rightarrow (Q \rightarrow R) \Leftrightarrow P \rightarrow (\sim Q \vee R) \\ \Leftrightarrow (P \wedge Q) \rightarrow R$$

(b) Object PDNF of

$$(P \wedge Q) \vee (\sim P \wedge R) \vee (Q \wedge R).$$

18. Prove that a graph is Eulerian iff all the vertices are of even degree.

19. (a) Using Karnaugh map method find the minimal sum-of-product

$$f(a, b, c, d) = \sum 0, 5, 7, 8, 12, 14.$$

(b) Implement Boolean function  $f(x, y, z) = (x \wedge y) \vee (x' \wedge y') \vee (y' \wedge z')$  using AND, OR gates only.

PROGRAMMING IN C++

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Time : Three hours

Maximum : 100 marks

## PART A — (6 × 5 = 30 marks)

Answer any SIX questions.

1. Explain about any two basic concepts of OOP.
  2. Explain various arithmetic operators with example.
  3. Explain the concept of object with suitable example.
  4. Explain this pointer with example.
  5. Explain the basic elements of a function with suitable example.
  6. Explain an two types of storage classes supported in C++.
  7. Explain the purpose of overloading operators.
  8. Explain runtime polymorphism.
9. What is the use of inheritance? Explain
10. Explain the concept of virtual base classes.

## PART B — (4 × 10 = 40 marks)

Answer any FOUR questions.

11. Explain I/O operations in C++
12. Compare break and continue statements with examples.
13. Illustrate the reference arguments with programming example.
14. Write a C++ program to add two complex numbers.
15. Explain the types of base classes with suitable examples.
16. Explain the use of friend function with suitable programming example.

## PART C — (2 × 15 = 30 marks)

Answer any TWO questions.

17. Write an essay on various control statements available in C++ with suitable syntax and examples.
18. Explain overloading of operators in C++. Write a program to over load a binary operator.

19. Write note on
- (a) Function overloading
  - (b) Virtual destructor
  - (c) Inline function
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## COMPUTER GRAPHICS

Time : Three hours

Maximum : 100 marks

## PART A — (6 × 5 = 30 marks)

Answer any SIX questions.

1. Explain Graphical User interface.
2. Explain pixels and frame buffers.
3. Explain the primitive commands for drawing a line segment.
4. Explain how to delete a segment.
5. Explain the acoustic tablet and Electro Acoustic tables.
6. Describe winding number method for defining polygon's interior points.
7. Obtain rotation 2-D transformation matrix.

8. Explain display procedures briefly.

9. Explain mid point sub division.

10. Explain clipping of polygons.

## PART B — (4 × 10 = 40 marks)

Answer any FOUR questions.

11. Write any three Graphics applications.
12. Explain the concept of character generation.
13. Explain
  - (a) Direct View Storage tubes and
  - (b) Plasma Panel
14. Explain the polygon interfacing algorithms
  - (a) to set a flag indicating that polygon should be filled and
  - (b) to set the polygon interior style
15. Obtain the matrix of transformation for scaling and translation.
16. Explain three dimensional transformations in detail.

## PART C — (2 × 15 = 30 marks)

Answer any TWO questions.

17. Describe the Bresenham's Line drawing algorithm.
18. Discuss in detail TEST primitive operations.
19. Explain Cohen-Sutherland algorithms for clipping lines.

## OPERATING SYSTEMS

Time : Three hours

Maximum : 100 marks

## PART A — (6 × 5 = 30 marks)

Answer any SIX questions.

1. Discuss the need for the operating system.
2. Explain I/O protection.
3. Write note on scheduling Queues.
4. Explain any two OS schedulers.
5. What are the necessary conditions for the occurrence of deadlock? Explain.
6. Explain in detail about the virtual memory.
7. Explain process control Block.
8. Discuss briefly the multiprogramming.

9. Explain any five DOS commands used to working with Directories.

10. Explain BSD Kernel I/O structure.

## PART B — (4 × 10 = 40 marks)

Answer any FOUR questions.

11. Explain protection requirement for memory and processor.
12. Explain how semaphore s may be used to enforce mutual exclusion.
13. Discuss the role of semaphore with an example.
14. Explain priority based pre-emptive scheduling algorithm.
15. Discuss various DOS commands used to work with files.
16. Describe briefly the history of Unix operating

## PART C — (2 × 15 = 30 marks)

Answer any TWO questions.

17. (a) Discuss performance criteria for computer scheduling algorithms.

(b) Explain an one scheduling algorithm examples.

18. (a) Explain Optimal replacement and Adhoc replacement algorithms.

(b) Explain how information is Protected physical damage and improper access.

19. (a) What do you mean by semaphore? Explain detail with suitable examples.

(b) Explain various mechanisms that support distributed processing on Windows 2000.

## COMPUTER ORGANISATION

Three hours

Maximum : 100 marks

PART A — (6 × 5 = 30 marks)

Answer any SIX questions.

Explain instruction code and their usage.

Explain control unit with a block diagram.

Discuss arithmetic Logic unit with suitable circuit.

Explain the pipeline processing using a simple diagram.

Explain peripherals devices.

What are the advantages of using micro programmed control unit?

Explain asynchronous data transfer.

Write note on Strobe control

Explain interrupt cycle micro operations with a diagram.

Explain memory protection.

PART B — (4 × 10 = 40 marks)

Answer any FOUR questions.

11. Explain three categories of computer Instructions.
12. Explain the micro instruction format with suitable example.
13. Explain any one priority interrupt.
14. Explain any two modes of data transfer between central computer and peripherals.
15. Explain associative memory table with suitable block diagram.
16. Explain cache memory with the help of diagram.

PART C — (2 × 15 = 30 marks)

Answer any TWO questions.

17. Explain the cache memory organization.
18. Discuss I/O Bus and Interface Module with suitable diagrams.
19. Write note on
  - (a) Associative memory
  - (b) Address space and Memory space.

## COMPUTER ALGORITHMS AND DATA STRUCTURE

Time : Three hours

Maximum : 100 marks

## PART A — (6 × 5 = 30 marks)

Answer any SIX questions.

1. Explain binary search with simple example.
2. Explain Strassen's Matrix multiplication.
3. What is greedy method? Explain.
4. Explain the problem of optimal storage on tapes.
5. Explain Hash function with suitable example.
6. Explain and/or Graphs with example.
7. Define Queue. Explain the operation that can be performed on Queue.

8. Explain mazing problem with suitable figure.
9. Define Binary tree with example and List the properties of Binary trees.
10. Explain in order traversal of binary tree.

## PART B — (4 × 10 = 40 marks)

Answer any FOUR questions.

11. Write procedure for creating, inserting, and deleting items from a linked list.
12. Draw binary decision tree for binary search with  $n-12$ .
13. Explain optimal binary search tree for the given identifier set with suitable algorithm.
14. Write procedure for creation, add and delete elements in a stack.
15. Explain pattern matching strings with suitable algorithm.
16. Write an algorithm to search a binary search tree.

## PART C — (2 × 15 = 30 marks)

Answer any TWO questions.

17. Explain :
  - (a) Prim's algorithm and
  - (b) Kruskal's Algorithm.
18. Discuss multistage graphs and the formulation of it by dynamic programming and backward approach.
19. (a) Write an algorithm to find all pairs shortest path.
  - (b) Explain various operations on Doubly linked list.

