

**FACULTY OF INFORMATICS**  
**M.C.A. (2 Years Course) III- Semester (CBCS) (Backlog) Examination,**  
**October/November 2023**

**Subject: Computer Networks**

**Time: 3 Hours**

**Max. Marks: 70**

**Note: I. Answer one question from each unit. All questions carry equal marks.**  
**II. Missing data, if any, may be suitably assumed.**

**Unit – I**

1. a) Explain the different types of network topologies.  
b) Describe the concept of RS-232 interfacing.  
**(OR)**
2. a) Briefly explain the TCP/IP reference model.  
b) Discuss the different line coding techniques.

**Unit – II**

3. a) Briefly discuss the concept of Hamming code.  
b) Explain the different types of ALOHA.  
**(OR)**
4. a) Describe the Error control mechanism.  
b) Explain different types of ARP in detail.

**Unit – III**

5. a) Discuss the Distance Vector Routing protocol.  
b) Briefly explain the concept of ICMP.  
**(OR)**
6. a) Describe the IPv4 addressing methods in detail.  
b) Explain the concept of BGP.

**Unit – IV**

7. a) Describe the Time Division Multiplexing in detail.  
b) Briefly explain the TCP Timer management.  
**(OR)**
8. a) Discuss the various services of TCP.  
b) Explain the Quality of Services.

**Unit – V**

9. a) Describe an iterative communication by using UDP.  
b) Explain the SMTP works in detail.  
**(OR)**
10. a) Discuss the functions of Application Layer.  
b) Explain the HTTP in detail.

**FACULTY OF INFORMATICS**  
**M.C.A. (3 Years Course) III Semester (CBCS) (Backlog) (Old) Examination,**  
**October/November 2023**

**Subject: Design and Analysis of Algorithms**

**Time: 3 Hours**

**Max. Marks: 70**

**Note: I. Answer one question from each unit. All questions carry equal marks.**  
**II. Missing data, if any, may be suitably assumed.**

**Unit – I**

1. a) Discuss the big theta notation with an example.
- b) Explain about the concept of queues.

**(OR)**

2. a) Discuss the concept and uses dictionaries.
- b) Write the notes on sets and disjoint sets.

**Unit – II**

3. a) Give an overview of merge sort method.
- b) Discuss how to find the convex hull.

**(OR)**

4. a) Describe the tree vertex splitting procedure.
- b) Elaborate the steps of solving job sequencing with deadlines.

**Unit – III**

5. a) Describe the dynamic programming method for solving 0/1 knapsack problem.
- b) Illustrate the prim's spanning tree method.

**(OR)**

6. a) Give an overview of the traveling salesperson problem.
- b) Discuss the methods for graphs traversal.

**Unit – IV**

7. a) Explain the solution to finding sum of subsets.
- b) Elaborate the branch and bound strategy.

**(OR)**

8. a) Describe the 8-queens problem using backtracking .
- b) Discuss the graphs coloring methods.

**Unit – V**

9. a) Discuss the details of cook's theorem.
- b) Give an overview of NP-Hard problems.

**(OR)**

10. a) Explain the problems related to graphs.
- b) Describe about the simplified NP-Hard problems.

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**Unit – I**

1. Explain asymptotic notations?

**(OR)**

2. Define the queue. What are the operations that can be performed on queue? Explain.

**Unit-II**

3. Write an algorithm for search a key in Binary search tree using divide & conquer method? Explain with suitable example.

**(OR)**

4. Explain how Graham's scan algorithm solves the convex hull problem. Also explain its time complexity.

**Unit-III**

5. Solve the below given travelling sales person problem using method of Dynamic programming. [Cost adjacency matrix of graph =  $\{(0, 10, 15, 20), (5, 0, 9, 10), (6, 13, 0, 12), (8, 8, 9, 0)\}$ ].

**(OR)**

6. Solve the following instance of the all pairs shortest path problem using method of dynamic programming for given graph matrix [Cost adjacency matrix of graph =  $\{(0, 4, 11), (6, 0, 2), (3, \infty, 0)\}$ ].

**Unit-IV**

7. Let  $w = \{5, 7, 10, 12, 15, 18, 20\}$  and  $m = 35$ . Find all possible subsets of  $w$  that sum to  $m$ . Do this using sumofsub. Draw the portion of the state space tree that is generated?

**(OR)**

8. Draw the portion of the state space tree generated by FIFO Branch and Bound (FIFO BB) method for  $n = 5$ ,  $(p_1, p_2, \dots, p_5) = (10, 15, 6, 8, 4)$ ,  $(w_1, w_2, \dots, w_5) = (4, 6, 3, 4, 2)$  and  $m = 12$ , of 0/1 knapsack problem?

**Unit-V**

9. Write short notes on following  
(a) NP-Hard and NP-Complete (b) Cook's theorem

**(OR)**

10. Discuss detailed about Job shop scheduling.

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