

17636

21415

3 Hours / 100 Marks

Seat No.

--	--	--	--	--	--	--	--

Instructions : (1) All Questions are *compulsory*.

(2) Illustrate your answers with neat sketches wherever necessary.

(3) Figures to the right indicate full marks.

(4) Mobile Phone, Pager and any other Electronic Communication devices are not permissible in Examination Hall.

Marks

1. Solve any FIVE :

5 × 4 = 20

- (a) Explain average and worst case analysis of algorithms.
- (b) What is meant by efficiency of algorithm ? Explain it.
- (c) Describe divide and conquer strategy. Explain with an example.
- (d) Explain merge sort algorithm. Give the time complexity of merge sort.
- (e) Explain dynamic programming. What is meant by principle of optimality.
- (f) Define Graph, Cyclic graph and Directed graph. Mention how representation of graph is done in memory.
- (g) Prove that the Dijkstra's algorithm finds the shortest path from a single source to the other nodes of a graph.

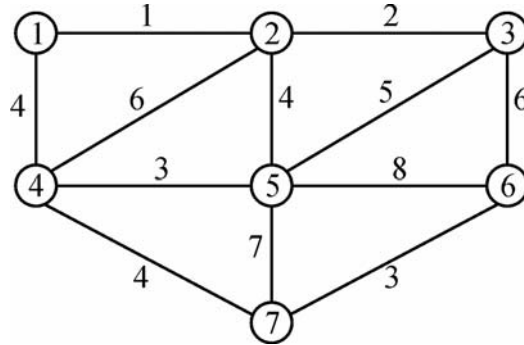
2. Solve any TWO :

2 × 8 = 16

- (a) What is asymptotic notation ? Explain Big O notation.
- (b) Explain exponentiation as an example of divide and conquer.

P.T.O.

- (c) Write down the Prim's algorithm to generate minimum cost spanning tree. Simulate the algorithm for the given graph and find MST for the given graph.



3. Solve any TWO :

2 × 8 = 16

- Explain the Binary Search Algorithm using recursive function. Also explain the time complexity of Binary Search.
- Explain in detail radix sort algorithm with suitable example.
- Explain the steps of Kruskal's algorithm for finding the minimum cost spanning tree with suitable example.

4. Solve any TWO :

2 × 8 = 16

- Explain the following terms :
 - Problems and instances
 - Efficiency of algorithms
- Explain quick sort algorithm. Also explain time complexity of quick sort algorithm.
- Solve the following problem :

$(w_1, w_2, w_3, w_4, w_5) = (1, 2, 5, 6, 7)$

$(v_1, v_2, v_3, v_4, v_5) = (1, 6, 18, 22, 28)$

& the capacity of knapsack (M) = 11.

5. Solve any TWO :**2 × 8 = 16**

- (a) What is a binomial heap ? What is the advantage of binomial heap over a heap ?
- (b) What is the solution generated by the job sequencing with deadlines algorithm to the following scheduling instance $n = 7$
 $(P_1, P_2, \dots, P_7) = (3, 5, 20, 8, 1, 6, 30)$
and $(d_1, d_2, \dots, P_7) = (1, 3, 4, 3, 2, 1, 2)$?
- (c) Explain the BFS algorithm. Also using a suitable example draw BFS tree.

6. Solve any TWO :**2 × 8 = 16**

- (a) Explain divide and conquer way of multiplication for the multiplication of 981 by 1234.
 - (b) What do you mean by scheduling ? Also explain scheduling with deadlines by taking a suitable example.
 - (c) Explain with suitable example the DFS for undirected graph, also explain the Depth First Search algorithm.
-

