17636

21819

3 Hours / 100 Marks

Seat No. | | | | | | | | |

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

(2) Answer each next main Question on a new page.

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

(4) Figures to the right indicate full marks.

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

Marks

1. Solve any FIVE : **$5 \times 4 = 20$**

(a) Define algorithm with respect to efficiency.

(b) Explain the Average and Worst case analysis of algorithm.

(c) Define devide & conquer. Explain with an example.

(d) Explain exponentiation as an example of divide and conquer.

(e) Describe in brief, the terms related to graph : nodes, edges, indegree, outdegree.

(f) Explain the linked representation of a graph with suitable example.

(g) Explain :

(i) dynamic programming

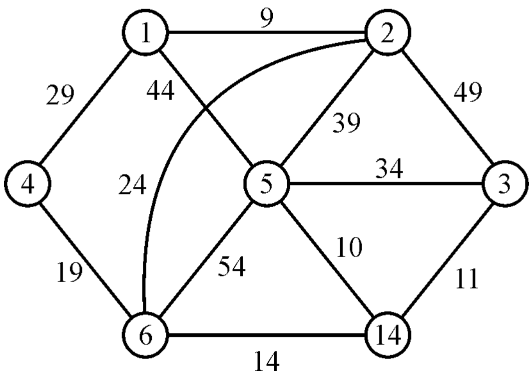
(ii) principle of optimality

2. Solve any TWO : $2 \times 8 = 16$

(a) Describe asymptotic notation. Explain Big O notation.

(b) Explain the merge sort algorithm. Give the time complexity of merge sort.

(c) Explain the Kruskal's algorithm. Find minimum cost spanning tree for given graph.



3. Solve any TWO : $2 \times 8 = 16$

(a) Compare time complexity and space complexity with respect to algorithm.

(b) Write and explain the procedure for recursive quick sort. Justify the same with example.

(c) Explain the BFS (Breadth First Search) Algorithm. Also using a suitable example draw the BFS tree.

4. Solve any TWO : $2 \times 8 = 16$

(a) Compare Quick Sort and heap sort with respect to working principle and time complexity.

(b) Explain scheduling with deadlines by taking a suitable example.

(c) Explain with suitable example 'Depth First Search' for undirected graph.

5. Solve any TWO : **$2 \times 8 = 16$**

(a) Explain the following :

(i) Elementary operation

(ii) Theta and Omega notation

(b) Write an algorithm for radix sort and arrange the given numbers in ascending order using radix sort

361, 12, 527, 143, 9, 768, 348

(c) Solve the following problem :

$(W_1, W_2, W_3, W_4, W_5) = (1, 2, 5, 6, 7)$

$(V_1, V_2, V_3, V_4, V_5) = (1, 6, 18, 22, 28)$

and the capacity of Knapsack (M) = 11

6. Solve any TWO : **$2 \times 8 = 16$**

(a) Define binomial heap. What is the advantage of binomial heap over a heap ?

(b) Let there are n = 4 jobs, their respective profit values are as $(P_1, P_2, P_3, P_4) = (100, 10, 15, 27)$ & deadlines for respective jobs are as $(d_1, d_2, d_3, d_4) = (2, 1, 2, 1)$. Find the optimal solution.

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