Q.P. Code – 68433

Fourth Semester B.C.A. Degree Examination, April/May 2019

(CBCS Scheme)

Computer Science

ANALYSIS AND DESIGN OF ALGORITHMS

Time : 3 Hours] *[Max. Marks : 90*

Instructions to Candidates : Answers ALL the Sections.

SECTION – A

Answer any **TEN** of the following. **(10 × 1 = 10)**

1. Define order of growth.
2. What are the types of control structures used in structured programming?
3. Define worst case.
4. Write general recurrence equation for divide and conquer method.
5. Mention the types of Knapsack problem.
6. Define minimum spanning tree.
7. What is subgraph?
8. Define cycle.
9. Give the definition of binary tree.
10. What is forest?
11. Define E-node.
12. What is Hamiltonian cycle?

SECTION – B

Answer any **FIVE** of the following. **(5 × 3 = 15)**

13. List out different asymptotic notations and their significance.
14. Explain divide and conquer design technique.
15. Write Dijikstra's algorithm.
16. How graphs are represented in memory? Explain.

17. Write algorithm for post order binary tree traversal.

18. Give general method of backtracking.

19. Explain sum of subsets problem.

SECTION – C

Answer any **SIX** of the following : **(6 × 5 = 30)**

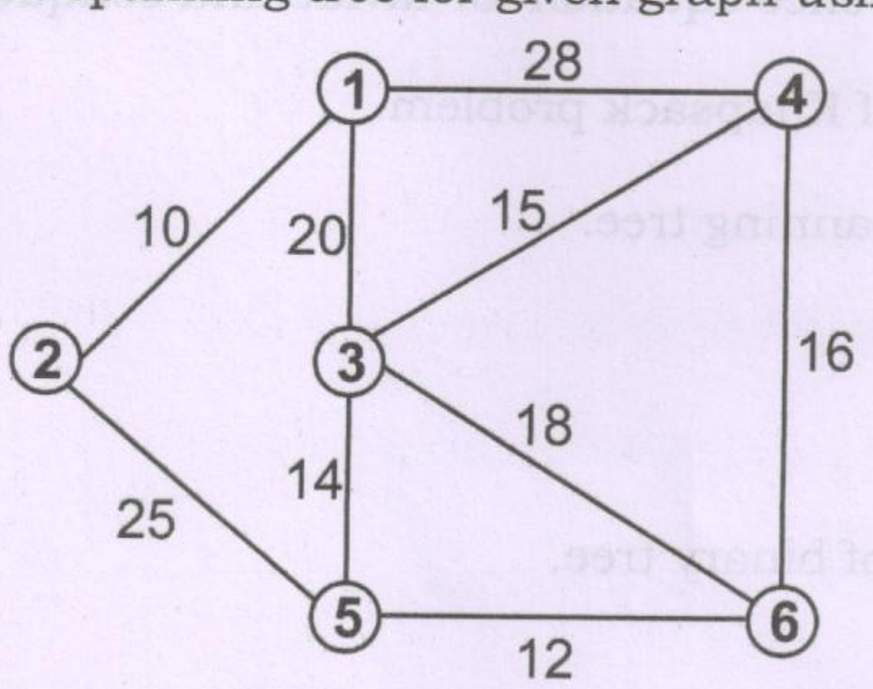
20. What is space complexity? Write algorithm to find sum of array elements and calculate its space complexity.

21. Write recursive algorithm for binary search.

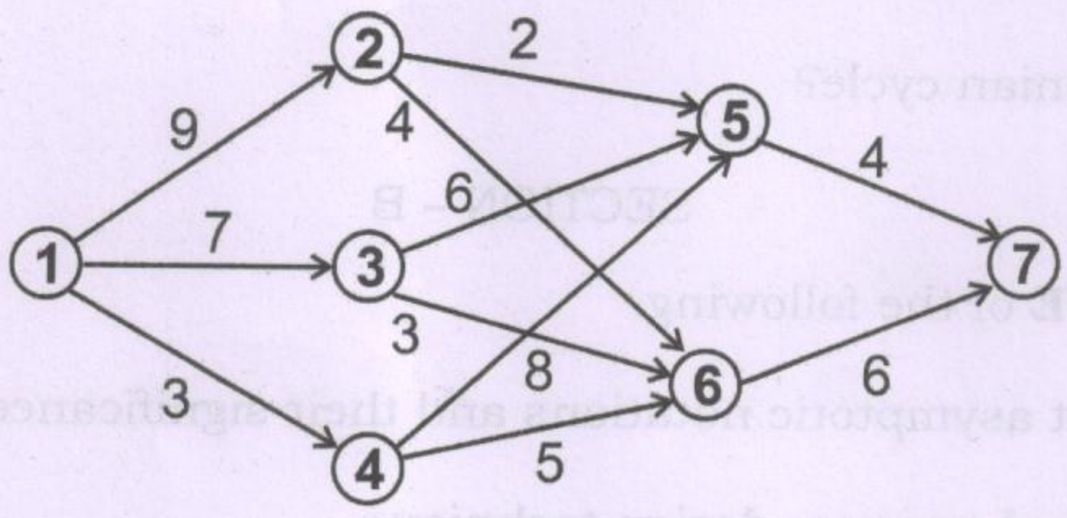
22. Explain max-min problem using divide and conquer method with an example.

23. Solve job sequencing problem, Given n = 5, profits = (2, 5, 20, 10, 15) and deadlines = (2, 3, 2, 1, 3) using greedy strategy.

24. Find minimum weight spanning tree for given graph using Kruskal's algorithm.



25. Find minimum cost path for below multistage graph using backward approach.



26. Write algorithm for breadth first search with an example.

27. Draw and explain with state space tree for graph coloring when n = 3 (vertices count) m = 3 (color count).

SECTION – D

Answer any **FIVE** of the following. **(5 × 7 = 35)**

28. (a) Differentiate between analysis and profiling.

(b) Explain the advantages of structured programming. **(3 + 4)**

29. Give algorithm for merge sort and analyze it.

30. Solve Greedy Knapsack problem for an optimal solution,

Given weights = (1, 12, 5, 9, 3, 10), Profits = (2, 10, 5, 3, 4, 7) and Knapsack capacity $m = 35$.

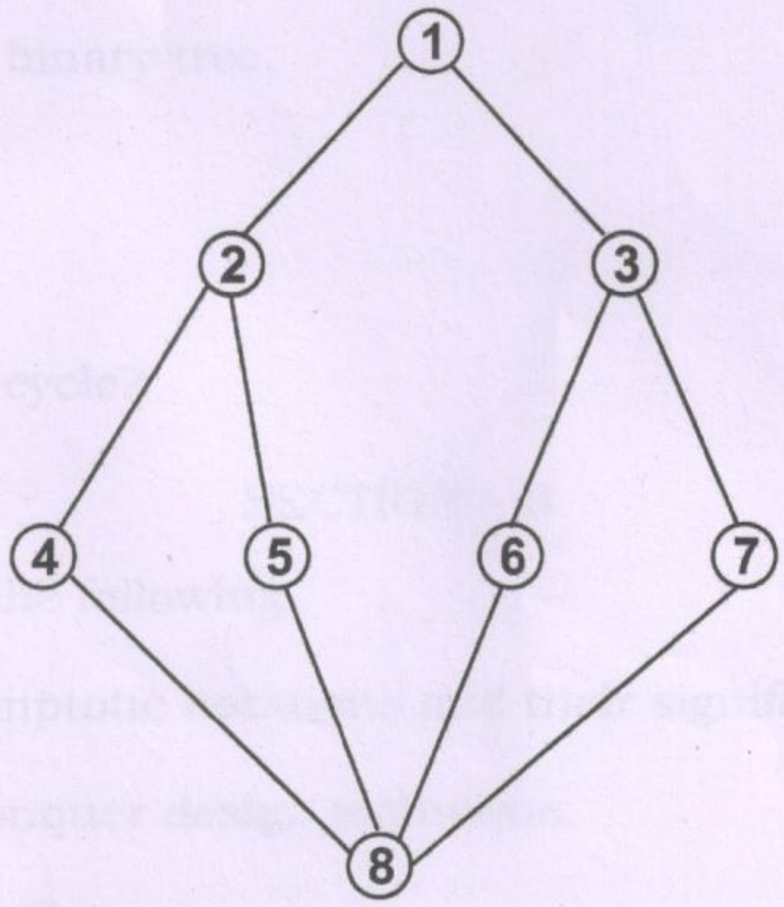
31. Find optimal tour cost for TSP for given cost matrix.

$c(i, j)$	1	2	3	4
1	0	10	15	20
2	5	0	9	10
3	6	3	0	12
4	8	8	9	0

32. (a) Write Floyd's algorithm.

(b) Give the properties of binary tree. **(3 + 4)**

33. Traverse given graph using DSF through stack.



34. Explain 4-queens problem along with constraints.
