



SM – 633

VI Semester B.C.A. Examination, May/June 2018

(Y2K8 Scheme)

COMPUTER SCIENCE

BCA 601 : Design and Analysis of Algorithms

Time : 3 Hours

Max. Marks : 100

Instruction : Answer all Sections.

SECTION – A

I. Answer **any ten** questions. **Each** carries **two** marks. (10×2=20)

- 1) What are the characteristics of an algorithm ?
- 2) Write any two differences between analysis and profiling.
- 3) Write the control abstraction for greedy method.
- 4) What is knapsack problem ?
- 5) What is minimum spanning tree ?
- 6) What is flow shop scheduling ?
- 7) Define directed graph and cycle.
- 8) Mention two different ways to represent a graph.
- 9) What is strictly Binary tree ?
- 10) What is Hamiltonian cycle ?
- 11) What is sum of subset problem ?
- 12) What is Backtracking ?

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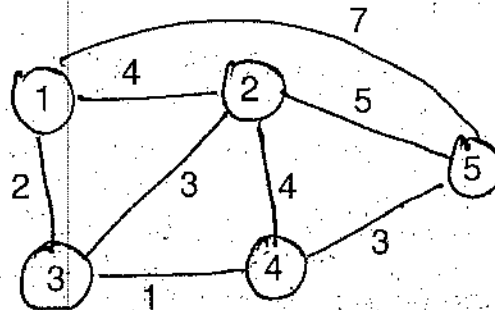
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SECTION - B

II. Answer **any five** questions. **Each** carries **five** marks. (5×5=25)

- 13) Discuss order of Growth.
- 14) Explain time and space complexity of an algorithm with an example.
- 15) Explain what are the basic steps that are to be followed to analyze recursive and non-recursive algorithm.
- 16) Find the minimum cost spanning tree by Prim's algorithm.



- 17) What is dynamic programming ? Mention the difference between divide and conquer and dynamic programming.
- 18) Write floyd algorithm and find its time complexity.
- 19) Explain 4-Queens problem.
- 20) Compare depth first search and breadth first search.

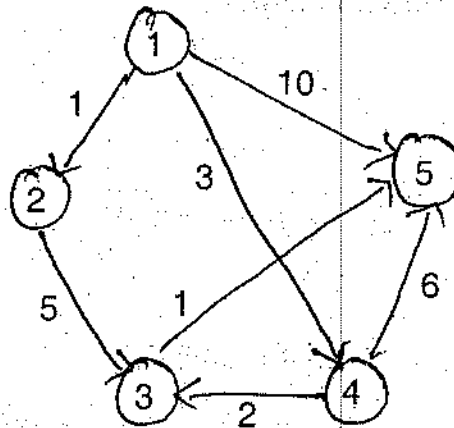
SECTION - C

III. Answer **any three** questions. **Each** carries **fifteen** marks. (3×15=45)

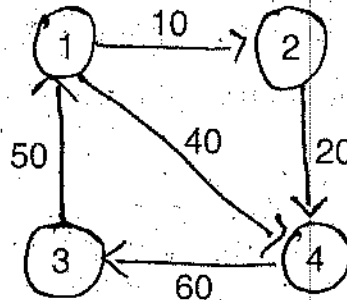
- 21) a) Write an algorithm for finding maximum and minimum and find the time complexity. 8
- b) Write binary search algorithm. 7
- 22) a) Write merge sort algorithm to sort a set of numbers in ascending order. Analyze its space and time complexity. 7
- b) Trace the merge sort algorithm to sort the following elements
35, 10, 15, 45, 25, 20, 40. 8



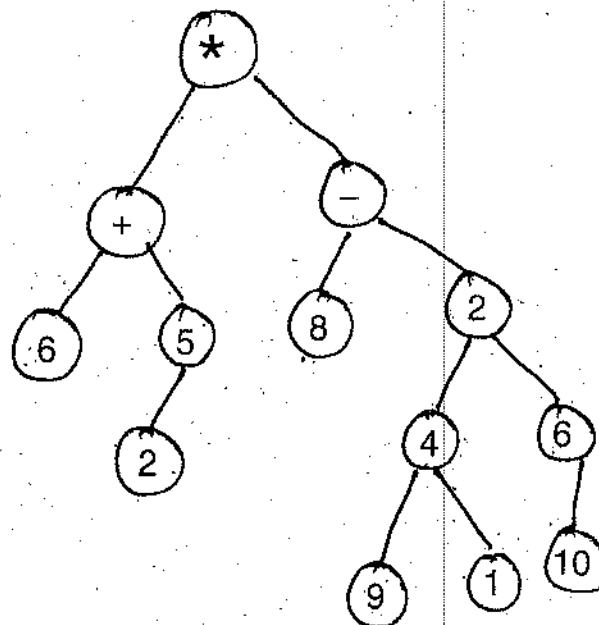
23) Find the shortest distance from node 1 to all other node using Dijkstra's algorithm for the following graph.



24) Determine all pairs shortest paths for the weighted graph.



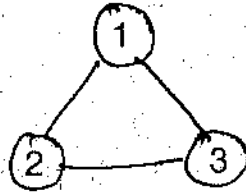
25) a) Define tree. Traverse the following tree in preorder, postorder and inorder.



10



- b) Draw the state space tree for the graph with $n = 3$ vertices and $m = 3$ colours (Red, Blue and Green). 5



SECTION - D

IV. Answer **any one** question. **Each** carries **ten** marks. (1×10=10)

- 26) Find the optimal solution to the greedy knapsack problem where $M = 40$
 $N = 4$ weights $[W_1, W_2, W_3, W_4] = [20, 25, 10, 15]$ profits $[P_1, P_2, P_3, P_4] =$
 $[20, 40, 35, 45]$. Also find maximum profit earned.
- 27) Find the minimum cost path for the below multistage graph. Using forward approach.

