



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 ?

P.T.O.

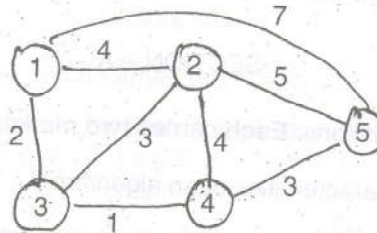


SECTION - B

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

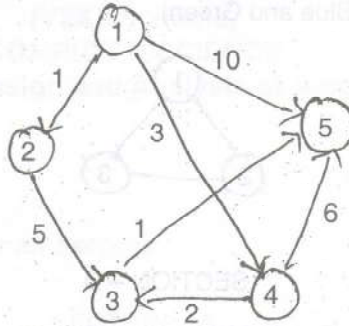
III. Answer **any three** questions. **Each** carries **fifteen** marks.

(3×15=45)

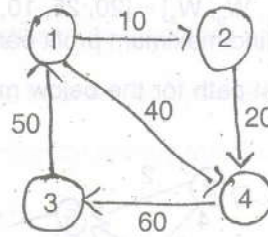
- 21) a) Write an algorithm for finding maximum and minimum and find the time complexity. 8
- b) Write binary search algorithm. 7
- 22) a) Write merge sort algorithm to sort a set of numbers in ascending order. Analyze its space and time complexity. 7
- b) Trace the merge sort algorithm to sort the following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

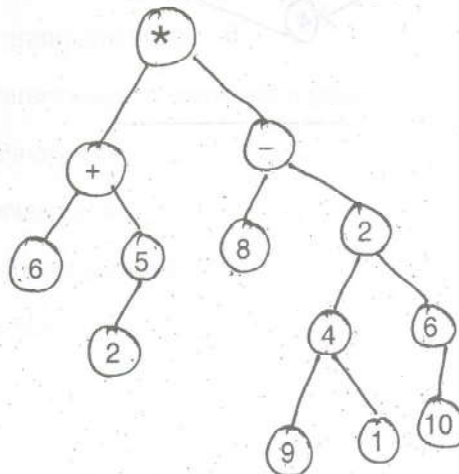


- 24) Determine all pairs shortest paths for the weighted graph.



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

10

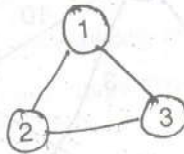


SM - 633

-4-



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



SECTION - D

(1×10=10)

IV. Answer **any one** question. Each carries **ten** marks.

- 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.

