

SE - 539

**IV Semester B.C.A. Degree Examination, June/July 2026
(SEP 2024 - 25)**

COMPUTER APPLICATIONS

24BCA42 : Design and Analysis of Algorithms

Time : 3 Hours

Max. Marks : 80

Instruction : Answer all the Parts.

PART - A

I. Answer any eight questions. Each question carries 2 marks. (8×2=16)

- 1) Define an algorithm.
- 2) Define space and time complexities.
- 3) What are asymptotic notations ?
- 4) What is P-class complexity ?
- 5) State brute-force method.
- 6) Define greedy algorithm.
- 7) Define Huffman codes.
- 8) What is dynamic programming ?
- 9) What is minimum spanning tree ?
- 10) Write the goal of n-Queen problem.

PART - B

II. Answer any four questions. Each question carries six marks. (4×6=24)

- 11) Explain worst case, best case and average case efficiencies with example.
- 12) Trace insertion sort algorithm for the following array.
34, 12, 17, 45, 21, 20, 40.
- 13) Explain mathematical analysis of Non-recursive algorithm with example.
- 14) Write an algorithm to sort elements using bubble sort and analyze its time complexity.
- 15) Explain Breadth first search with a suitable example.
- 16) Write a program to solve tower of Hanoi problem.

SE-539

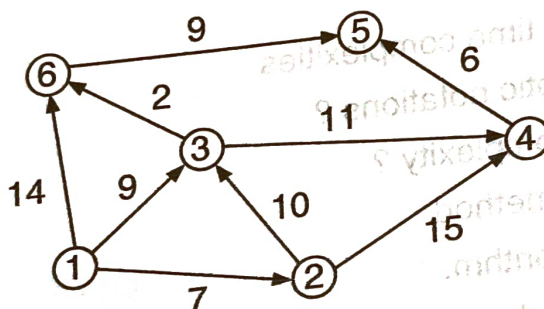
PART - C

(5×8=40)

III. Answer any five questions. Each question carries 8 marks.

- 17) a) Write the characteristics of an algorithm. 4
b) Explain fundamentals of algorithmic problem solving with flowchart. 4
- 18) Write and trace merge sort algorithm for the following numbers :
9, 7, 8, 3, 2, 1.

19) Find the shortest path from node 1 to all other nodes using Dijkstra's algorithm.



20) a) Explain depth first search with suitable example. 4
b) Explain topological sorting with example. 4

21) Solve 4 queen problem by back tracking technique. Draw the solution space. 4

22) a) What is dynamic programming ? Explain. 4
b) Describe sum of subsets problem with an example. 4

23) Explain hashing and how hashing improves execution time.