NP – 435

IV Semester B.C.A. Examination, July/August 2024
(NEP Scheme)
COMPUTER SCIENCE
Paper – 4.2 : Design and Analysis of Algorithm

Time : 2½ Hours Max. Marks : 60

Instruction : *Answer* ***all*** *the Sections.*

SECTION – A

Answer **any four** questions. **Each** question carries **two** marks. **(4×2=8)**

1. What is an algorithm ? Mention its characteristics.
2. Define space and time complexity.
3. Define divide and conquer technique.
4. State Brute-force method.
5. What is dynamic programming ?
6. What are P and NP complete problems ?

SECTION – B

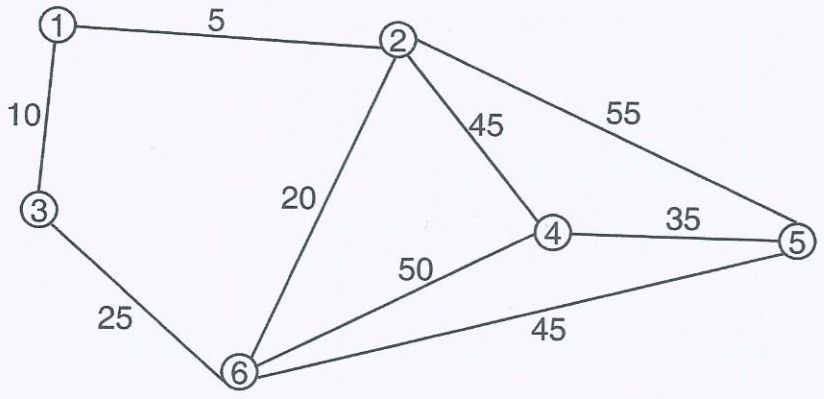
Answer **any four** questions. **Each** question carries **five** marks. **(4×5=20)**

7. Explain fundamentals of algorithmic problem solving.
8. Trace the insertion sort algorithm for the following array.
   35, 10, 15, 45, 25, 20, 40
9. Explain depth first search with suitable example.

P.T.O.

10. Differentiate between Dynamic programming and Greedy technique.

11. Apply Kruskal's algorithm to obtain the minimum cost spanning tree for the following graph.



12. To find the sum of subsets using backtracking for S = {7, 11, 13, 24} M = 31.

SECTION – C

Answer **any four** questions. **Each** question carries **eight** marks. **(4×8=32)**

13. a) Discuss important problem types.

    b) Explain mathematical analysis of recursive algorithm. **(4+4)**

14. Explain different asymptotic notations in detail. **8**

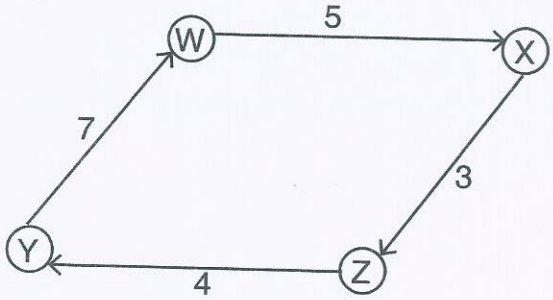
15. a) Write an algorithm for merge sort.

    b) Trace merge sort algorithm for the following arrays.

    30, 10, 40, 20, 50, 45, 60 **(4+4)**

16. Explain inorder, preorder and postorder tree traversal algorithm with an example. **8**

17. Consider the following graph to apply Floyd's algorithm. **8**



18. a) Explain 4 Queens problem using backtracking.
    b) Explain Knapsack problem. **(4+4)**
