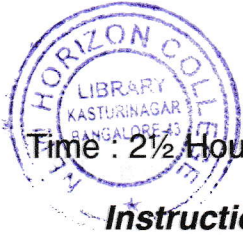DCCA – 501

V Semester B.C.A. Degree Examination, December 2024/January 2025
(NEP Scheme) (Freshers and Repeaters)
COMPUTER APPLICATIONS
DSC – 13 : Design and Analysis of Algorithms

Time : 2½ Hours

Max. Marks : 60

Instruction : Answer **all** the Sections.

SECTION – A

Answer **any 6** questions. **Each** question carries **2** marks.   (6×2=12)

1. What is Design and Analysis of Algorithm ?

2. Define worst case and best case efficiency.

3. What is brute force method ?

4. Write the time complexity and space complexity of selection sort.

5. What is decrease by a constant ? Give an example.

6. Write any two important properties of binary tree.

7. List any two advantages of divide and conquer technique.

8. Mention any two characteristics of Greedy technique.

9. What is problem reduction ?

SECTION – B

Answer **any 4** questions. **Each** question carries **6** marks.   (4×6=24)

10. Explain the time complexity of Bubble sort using operation count.

11. Explain the general plan for analyzing the time efficiency of recursive algorithm.

12. Write and Explain BFS algorithm with an example.

13. Explain topological sorting algorithm in detail and discuss the complexity of it.

P.T.O.

14. Write prims algorithm to find the Minimum Spanning Tree.

15. Explain optimizing algorithm efficiency through lower bound analysis.

SECTION – C

Answer **any 3** questions. **Each** question carries **8** marks.   **(3×8=24)**

16. Write an algorithm to find the factorial of a number using recursion. Give its space complexity.

17. Consider the knapsack problem with the following inputs. Solve the problem using exhaustive search. Enumerate all possibilities and indicate unfeasible solutions and optimal solutions.
    Knapsack total capacity W = 15kg.

Items	A	B	C	D
Weight	3	5	4	6
Value	36	25	41	34

18. Explain and find the topological sort for the below Directed Acyclic Graph.
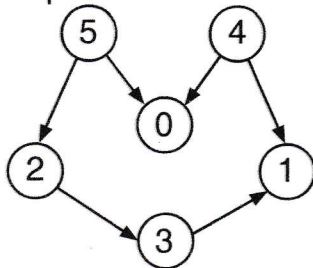
19. Explain different binary tree traversals with an example. Explain how Divide and Conquer technique is applied in it.

20. Explain and develop the minimum cost spanning tree using kruskal's algorithm for the below tree.