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B.M.S COLLEGE FOR WOMEN, AUTONOMOUS
BENGALURU – 560004
SEMESTER END EXAMINATION – SEPTEMBER 2023

B.C.A.- 4th Semester

ANALYSIS AND DESIGN OF ALGORITHMS
(NEP Scheme 2021-22 Onwards)

Course Code: BCA4DSC11

Duration: 2 ½ Hours

QP Code: 4032

Max. Marks: 60

Instruction: Answer all the sections.

PART-A

Answer any TEN questions. Each question carries TWO marks.

(10X2=20)

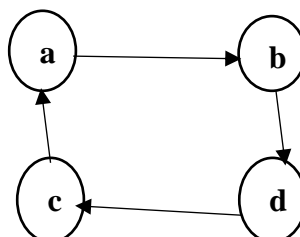
1. Define Algorithm. List out the criteria's that all algorithms must satisfy.
2. On what factors efficiency of an algorithm depends?
3. Arrange the following functions in ascending order: n , 2^n , $n!$, n^3 , $n \log n$, $\log n$, n^2
4. Define Brute force method. List out the problems that can be solved using this method.
5. Define sorting list any two sorting techniques.
6. Mention the steps involved in merge sort.
7. Define i) Transitive Closure ii) Adjacency Matrix
8. State Horspool's algorithm for pattern matching.
9. Define i) Feasible Solution ii) Optimal Solution
10. Define Minimum Spanning Tree.
11. What is Backtracking?
12. What is sum of sub-set problem?

PART-B

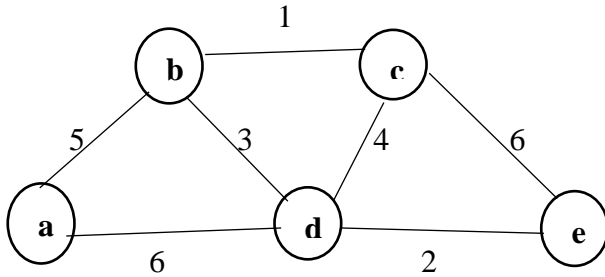
Answer any SIX questions. Each question carries FIVE marks.

(6X5=30)

13. Explain Asymptotic notations with graph and example for each.
14. Write an algorithm for DFS traversal.
15. What is dynamic programming? Find transitive closure of a given diagram using Warshall's algorithm.



16. Write the algorithm to compute $C(n,k)$ [binomial co-efficient] by dynamic programming.
17. Apply Kruskal's algorithm to find a Minimum Spanning Tree for the following graph.



18. Define P, NP and NP-Complete problems.
19. Explain 4-queen's problem using Backtracking.
20. Solve the following knapsack problem using branch and bound given the following data: Capacity of Knapsack $M=10$

Item	Weight	Value	Weight/value
1	4	40	10
2	7	42	6
3	5	25	5
4	3	12	4

PART-C

Answer any ONE question. Each question carries TEN marks. (1X10=10)

21. Explain the various stages of an algorithm design and analysis process with the help of a flowchart.
22. Explain quicksort algorithm and give its efficiency. Trace the algorithm on the data: 25, 40, 16, 18, 52, 47, 81, 70
23. Explain Dijkstra's algorithm to solve Single Source Shortest Path. Apply this algorithm for the following graph with starting vertex as '1'.

