SHRIMATHI DEVKUNVAR NANALAL BHATT VAISHNAV COLLEGE FOR WOMEN (AUTONOMOUS)
(Affiliated to the University of Madras and Re-accredited with 'A+' Grade by NAAC)
Chromepet, Chennai — 600 044.
M.Sc. - END SEMESTER EXAMINATIONS APRIL - 2022
SEMESTER - II
20PCSCT2004 - Design and Analysis of Algorithms

Total Duration : 3 Hrs. **Total Marks : 60**

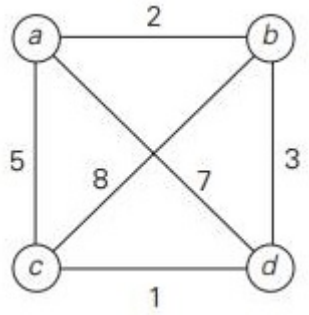
Section A

Answer any **SIX** questions $(6 \times 5 = 30$ Marks)

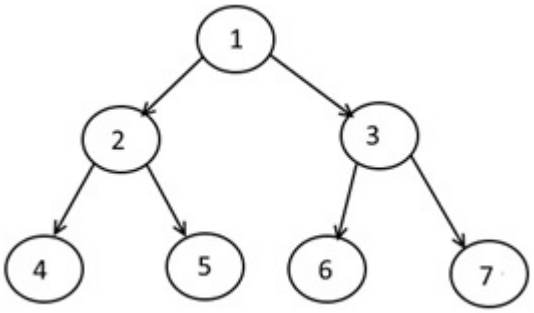
1. Define the term algorithm and state the criteria the algorithm should satisfy.
2. Solve the following instance of the 0/1 knapsack problem using dynamic programming:

Weight	1	2	3	2
Profit	10	15	25	12

   The capacity of the knapsack m=5.
3. Apply Branch and Bound algorithm to solve the Travelling Salesman problem for the following graph.



4. Describe NP-hard and NP-complete problem.
5. Show the Best, Worst and Average case analysis for Quick sort.
6. Apply Depth First Search traversal on the following graph:



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7. Describe graph coloring problem and write an algorithm for m-coloring problem.
8. How is lower bound found by problem reduction? Explain.

Section B

Part A

Answer any **TWO** questions $(2 \times 10 = 20$ Marks)

9. Illustrate briefly on Big oh-notation, Omega Notation and Theta Notation. Depict the same graphically and explain.
10. Compute the multiplication of given two matrices using Strassen's matrix multiplication method.

$$A = \begin{bmatrix} 1 & 0 & 2 & 1 \\ 4 & 1 & 1 & 0 \\ 0 & 1 & 3 & 0 \\ 5 & 0 & 2 & 1 \end{bmatrix} \quad B = \begin{bmatrix} 0 & 1 & 0 & 1 \\ 2 & 1 & 0 & 4 \\ 2 & 0 & 1 & 1 \\ 1 & 3 & 5 & 0 \end{bmatrix}$$

11. Solve all-pair shortest path problem for the digraph with weight matrix given below:

	A	B	C	D
A	0	∞	∞	3
B	2	0	∞	∞
C	∞	7	0	1
D	6	∞	∞	0

12. Solve 8-Queens problem using back tracking.

Part B

Compulsory question $(1 \times 10 = 10$ Marks)

13. Determine the techniques useful for obtaining lower bounds.

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