M.Sc. (COMPUTER SCIENCE) SEM-I (CBCS-2018 COURSE): SUMMER 2022
SUBJECT: ALGORITHM DESIGN PATTERNS

Day: Friday
Date: 01-07-2022 S-20033-2022
Time: 3:00 P.M. TO 6:00 P.M.
Max. Marks: 60

N.B

1) All questions are **COMPULSORY**.
2) Figures to the right indicate **FULL** marks.
3) Draw diagrams wherever necessary.

Q.1 **a)** Illustrate with example Travelling salesman problem. **(15)**

OR

b) Explain the concept of Backtracking with the help of n-queen problem.

Q.2 **a)** Answer **ANY ONE** of the following. **(08)**

i) Illustrate Breadth first search graph traversal method.

ii) Solve following instance of knapsack by maximizing profit. Also map solution vector.

$M=7$, $P_i = \{5,5,6,8\}$, $W_i = \{1,1,3,2\}$

b) Answer **ANY ONE** of the following. **(07)**

i) Explain the concept of Binary search tree with example.

ii) Write 'MaxMin' recursive algorithm. Also explain with example.

Q.3 Answer **ANY THREE** of the following. **(15)**

a) Perform job sequencing with deadlines by maximizing profit for:

$J = (1,2,3,4,5)$, $d_i = (2,2,1,3,3)$

$P_i = (20,15,10,5,1)$

b) Discuss Kruskal's algorithm for finding minimum cost spanning tree.

c) What is Huffman coding? Explain.

d) Find optimal ordering on tapes and ERT for

$m=3$, $L_i = (2,3,9,13,7,5,10)$, $F_i = (1,10,5,20,5,5,5)$

e) Define: i) Time complexity ii) Space complexity.

Q.4 Write short notes **ANY THREE** of the following. **(15)**

a) Tower of Hanoi

b) NP-HARD Problem

c) Flow shop Scheduling

d) AND/OR Graph

e) Graph coloring problem

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