Code No.: AI405PC | R20 | H.T.No. | | | 8 | R | | | | | |

CMR ENGINEERING COLLEGE: : HYDERABAD
UGC AUTONOMOUS
II–B.TECH–II–Semester End Examinations (Supply) - July- 2024
DESIGN ANALYSIS OF ALGORITHMS
(CSM)

[Time: 3 Hours] **[Max. Marks: 70]**

Note: This question paper contains two parts A and B.
Part A is compulsory which carries 20 marks. Answer all questions in Part A.
Part B consists of 5 Units. Answer any one full question from each unit. Each question carries 10 marks and may have a, b, c as sub questions.

PART-A **(20 Marks)**

1. a) Explain divide-and-conquer. [2M]
   b) What is Space Complexity? Give an example. [2M]
   c) What is general backtracking method? [2M]
   d) Explain disjoint set operation. [2M]
   e) List the advantages of dynamic programming [2M]
   f) Explain reliability design. [2M]
   g) What is job sequencing with deadlines? [2M]
   h) Define a Greedy strategy. [2M]
   i) What are the searching methods commonly used in branch and bound method? [2M]
   j) What is the difference between NP hard and NP Complete problem? [2M]

PART-B **(50 Marks)**

2. What is an algorithm? Explain its characteristics in detail. [10M]

OR

3. Simulate Quick sort algorithm for the following example [10M]
   25,36,12,4,5,16,58,54,24,16,9,65,78

4. How 8-Queen's problem can be solved using back tracking and explain with an example. [10M]

OR

5. Explain graph colour problem and draw the state space tree for m=3 colours n=4 vertices. [10M]

6. Explain optimal binary search tree with below example [10M]
   For n=4 identifiers (a1,a2,a3,a4)=(do, if, read, while), p(1:4)=(3,3,1,1)and Q(0:4)=(2,3,1,1,1)

OR

7. Explain 0/1 knapsack problem with dynamic programming find optimal solution for n=3, m=6 profits are(p1,p2,p3)=(1,2,5) & weights are (w1,w2,w3)=(2,3,4). [10M]

8. Explain Prim's algorithm for minimal spanning tree with an example. [10M]

OR

9. Explain the general principle of Greedy method and also list the applications of Greedy method. [10M]

10. Describe Travelling Salesperson Problem (TSP) using LC Branch and Bound and draw the state space tree with the following instance [10M]

$$\begin{bmatrix} \infty & 20 & 30 & 10 & 11 \\ 15 & \infty & 16 & 4 & 2 \\ 3 & 5 & \infty & 2 & 4 \\ 19 & 6 & 18 & \infty & 3 \\ 16 & 4 & 7 & 16 & \infty \end{bmatrix}$$

OR

11. Discuss Draw the portion of state space tree generated by FIFOBB for the following instance of 0/1 knapsack n= 5, M=12, (p1, ……p5) = (10,15,6,8,4) (w1,. ...w5)=(4,6,3,4,2) [10M]

****