Code No: R2031052 **R20** SET - 1

III B. Tech I Semester Supplementary Examinations, May/June -2024
DESIGN AND ANALYSIS OF ALGORITHMS
(Common to CSE, IT)

Time: 3 hours Max. Marks: 70

Answer any **FIVE** Questions **ONE** Question from **Each unit**
All Questions Carry Equal Marks
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UNIT-I

1. a) What is the importance of random variable in probabilistic analysis? Explain. [7M]
   b) Write about asymptotic notations. [7M]

(OR)

2. a) Explain the role of instance characteristics in finding the time and space complexities with an example. [7M]
   b) What is pseudo-code? Explain with an example. [7M]

UNIT-II

3. a) State the Greedy Knapsack? Find an optimal solution to the Knapsack instance n=3, m=20, (P1, P2, P3) = (25, 24, 15) and (W1, W2, W3) = (18, 15, 10). [7M]
   b) Show that the average case time complexity of quick sort algorithm is O (n loge n). [7M]

(OR)

4. a) Find optimal solution to the knapsack problem instance n=6, m=15,(p1…p6) = (10,5,15,7,6,18), (w1…w6) = (2,3,5,7,1,4). [7M]
   b) Analyze the best, average and worst case complexity of quick sort. [7M]

UNIT-III

5. a) Explain an algorithm to compute the all pairs shortest path using dynamic programming and prove that it is optimal. [7M]
   b) Write about 0/1 knapsack problem. [7M]

(OR)

6. a) Describe the Dynamic 0/1 Knapsack problem. Find an optimal solution for the dynamic programming 0/1 knapsack instance for n=3, m=6, profits are(p1, p2, p3) = (1, 2, 5), weights are (w1, w2, w3)=(2, 3, 4). [7M]
   b) Explain the Travelling sales man problem. [7M]

UNIT-IV

7. a) Define the backtracking algorithm for the sum of subsets problem using the states pace tree corresponding to m=35, w=(20,18,15,12,10,7,5). [7M]
   b) Illustrate control abstraction for backtracking. [7M]

(OR)

8. a) List out the detail about Hamiltonian cycles. Give example to it. [7M]
   b) Develop an algorithm to determine the Hamiltonian Cycle in a given graph using backtracking. [7M]

UNIT-V

9. a) Explain the importance of bounding function in generating the solutions. And also classify the different types of bounding functions with an example each. [7M]
   b) Apply branch and bound algorithm to solve the travelling salesman problem with an example. [7M]

(OR)

10. Summarize with short note on the following (i) Tractable and intractable problems (ii)P Problems (iii)Non deterministic algorithm (iv) NP problem (v)NP complete problems. [14M]

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