*Regulation R17* *Subject code: 1P5EC*

# TKR COLLEGE OF ENGINEERING AND TECHNOLOGY

(Autonomous, Accredited by NAAC with 'A+' Grade)

## B.Tech III Year I Semester Supplementary Examinations, February 2024

## Design And Analysis of Algorithms

*(CSE)*

***Maximum Marks: 70*** Date:20.02.2024 Duration: 3 hours

**Note:** **1.This question paper contains two parts A and B.**
**2. Part A is compulsory which carries 20 marks. Answer all questions in Part A.**
**3. Part B consists of 5 Units. Answer any one full question from each unit.**
**4. Each question carries 10 marks and may have a, b, c, d as sub questions.**

Part-A

**All the following questions carry equal marks** **(10X2M=20 Marks)**

| | | CO | Blooms Tx |
|---|---|---|---|
| 1 | Define the term time & space complexity | CO1 | L1 |
| 2 | What are the different types of time complexity? | CO1 | L1 |
| 3 | Define state space tree | CO2 | L1 |
| 4 | What is chromatic number? | CO2 | L1 |
| 5 | What is greedy method? | CO3 | L1 |
| 6 | List the applications of minimum spanning tree? | CO3 | L1 |
| 7 | What is called all pair shortest path problem? | CO4 | L1 |
| 8 | Define principle of optimality. | CO4 | L1 |
| 9 | State the methodology of Branch and Bound | CO5 | L1 |
| 10 | What is the relation between NP-hard and NP- complete? | CO5 | L1 |

Part-B

Answer All the following questions. **(10M X 5=50Marks)**

| | | | | |
|---|---|---|---|---|
| 11 | Make use of the recursive and iterative versions on the following example for binary search and compare the times? Write the algorithm for recursive method? 3,6,8,12,14,17,15,19,31,36,42,17,53,55,62 | 10M | CO1 | L3 |
| | OR | | | |
| 12 | Write the algorithm for quick sort recursively and using the algorithm find the sorting order for the following elements? Construct the tracing tree and recurrence relation and find out the time complexity. 9,3,7,5,6,4,8,2 | 10M | CO1 | L3 |
| 13 | Let W={5,7,10,12,15,18,20} and m=35 find all possible subsets of W that sum to M. Do this using sum of subsets (Back tracking method) Construct the portion of the state space tree that is generated. | 10M | CO2 | L3 |
| | OR | | | |
| 14 | Analyze the solutions to the N-queens problem using backtracking. | 10M | CO2 | L4 |

<table>
<tr><td>15</td><td>Explain the greedy technique for solving the Job Sequencing problem. For the following sequence of job, given the snapshot of execution which will achieve max. profit.
<table>
<tr><td>Job</td><td>1</td><td>2</td><td>3</td><td>4</td><td>5</td><td>6</td></tr>
<tr><td>Profit</td><td>20</td><td>15</td><td>10</td><td>7</td><td>5</td><td>3</td></tr>
<tr><td>deadline</td><td>3</td><td>1</td><td>1</td><td>3</td><td>1</td><td>3</td></tr>
</table></td><td>10M</td><td>CO3</td><td>L2</td></tr>
<tr><td></td><td colspan="3">OR</td><td></td><td></td></tr>
<tr><td>16</td><td>Apply the algorithm of Prim's minimum-cost spanning tree with an example.</td><td>10M</td><td>CO3</td><td>L3</td></tr>
<tr><td>17</td><td>Analyze the time and space complexity of Dynamic Programming travelling sales person algorithm</td><td>10M</td><td>CO4</td><td>L4</td></tr>
<tr><td></td><td colspan="3">OR</td><td></td><td></td></tr>
<tr><td>18</td><td>Explain the algorithm of matrix chain multiplication.</td><td>10M</td><td>CO4</td><td>L2</td></tr>
<tr><td>19</td><td>Explain the 0/1 Knapsack LCBB algorithm.</td><td>10M</td><td>CO5</td><td>L2</td></tr>
<tr><td></td><td colspan="3">OR</td><td></td><td></td></tr>
<tr><td>20</td><td>Differentiate between deterministic and non-deterministic algorithm</td><td>10M</td><td>CO5</td><td>L4</td></tr>
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