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PRESIDENCY UNIVERSITY BENGALURU

SCHOOL OF ENGINEERING

MAKEUP EXAMINATION - JULY 2024

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| **Semester : 3&4** | **Date : 15/07/2024** |
| **Course Code : CSE2007** | **Time : 9.30 AM to 12.30PM** |
| **Course Name :Design & Analysis of Algorithms** | **Max Marks : 100** |
| **Program : SoCSE/SoISE** | **Weightage : 50%** |

**Instructions:**

1. *Read all questions carefully and answer accordingly.*
2. *Question paper consists of 3 parts.*
3. *Scientific and non-programmable calculator are permitted.*
4. *Do not write any information on the question paper other than Roll Number.*

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| **PART A** | | | |
| **ANSWER ANY 4 QUESTIONS 4Q X 5M=20M** | | | |
| 1 | Explain Basic efficiency classes in detail | (CO 1) | [Knowledge] |
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| 2 | List the steps used to analyze recursive algorithms mathematically | (CO 1) | [Knowledge] |
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| 3 | Write the bubble sort algorithm. | (CO 2) | [Knowledge] |
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| 4 | Justify how binary search is efficient than linear search | (CO 3) | [Analyze] |
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| 5 | Explain the general method of dynamic programming | (CO 4) | [Knowledge] |
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| 6 | Describe a scenario where backtracking might not be the most efficient approach. What alternatives could be considered in such cases? | (CO 5) | [Comprehension] |
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| **PART B** | | | |
| **ANSWER ANY 5 QUESTIONS 5Q X 10M=50M** | | | |
| 7 | Explain in detail the various asymptotic notations with equation and graph | (CO 1) | [Knowledge] |
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| 8 | Apply Quick sort algorithm on the following elements: 6,4,8,2,5,7,9,3 | (CO 3) | [Apply] |
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| 9 | Write selection sort algorithm and also do its analysis. | (CO 2) | [Analyze] |
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| 10 | Give an algorithm to find the shortest path between every pair of vertices | (CO 4) | [Understanding] |
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| 11 | Apply backtracking to solve 4 \* 4 chessboard problem ( 4 queen’s problem) | (CO 5 ) | [Apply] |
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| 12 | Given the set, S= {1, 2, 3, 4, 5} and the sum d=9. Solve this sub-set-sum problem by applying backtracking technique | (CO 5 ) | [Apply] |
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| 13 | Discuss in detail the differences between divide and conquer technique and decrease and conquer technique. Also give your conclusion about which technique is best and why? | (CO 3) | [Evaluate] |
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| **PART C** | | | |
| **ANSWER ANY 2 QUESTIONS 2Q X 15M=30M** | | | |
| 14 | Design an algorithm to remove all the cycles present in any graph and also do its analysis | (CO 4) | [Analyze] |
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| 15 | Assume, there are 4 items and profit of these items are {12, 10, 20, 15} and their corresponding weights are {2, 1, 3, 2}. Apply dynamic programming to solve this knapsack problem by considering knapsack capacity as 5. | (CO 4) | [Apply] |
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| 16 | Write the merge sort algorithm and apply the same to sort the following elements: P,R,E,S,I,D,E,N,C,Y | (CO 3) | [Apply] |
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