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| Image result for adamas university logo | **ADAMAS UNIVERSITY**  **END SEMESTER EXAMINATION**  (Academic Session: 2020 – 21) | | |
| **Name of the Program:** | Master of Technology (M.Tech) in Computer Science and Engineering | **Semester:** | I |
| **Paper Title:** | Advanced Algorithms | **Paper Code:** | ECS61103 |
| **Maximum Marks:** | 50 | **Time Duration:** | 3 Hrs |
| **Total No. of Questions:** | **17** | **Total No of Pages:** | 3 |
| *(Any other information for the student may be mentioned here)* | 1. At top sheet, clearly mention Name, Univ. Roll No., Enrolment No., Paper Name & Code, Date of Exam. 2. All parts of a Question should be answered consecutively. Each Answer should start from a fresh page. 3. Assumptions made if any, should be stated clearly at the beginning of your answer. | | |

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| **Group A**  **Answer All the Questions (5 x 1 = 5)** | | | |
| 1 | What is a Greedy Algorithm? | **Remember** | **CO1** |
| 2 | What is Range Trees? | **Remember** | **CO2** |
| 3 | Define the divide and conquer method. | **Understand** | **CO3** |
| 4 | What is Binomial Queue? | **Remember** | **CO4** |
| 5 | What is NP-Complete? | **Understand** | **CO5** |
| **Group B**  **Answer All the Questions (5 x 2 = 10)** | | | |
| 6 a) | Explain Amortized complexity? | **Knowledge** | **CO1** |
| **(OR)** | | | |  | **(OR)** | | |
| 6 b) | Show the time complexity analysis for merge sort? | **Apply** | **CO1** |
| 7 a) | Explain Sparse Index with example? | **Knowledge** | **CO2** |
| **(OR)** | | | |  | **(OR)** | | |
| 7 b) | What is independent set? Explain with example? | **Knowledge** | **CO2** |
| 8 a) | Perform Radix sort on the following list of values.  523,610,214,367,143,2692 | **Knowledge** | **CO3** |
| **(OR)** | | | |  | **(OR)** | | |
| 8 b) | Perform Radix sort on the following list of values.  626,770,614,267,276,3571 | **Knowledge** | **CO3** |
| 9 a) | Construct Suffix Trie for the word “minimize” | **Apply** | **CO4** |
| **(OR)** | | | |  | **(OR)** | | |
| 9 b) | Construct Suffix Trie for the word “google” | **Apply** | **CO4** |
| 10 a) | Explain B tree with Proper example? | **Knowledge** | **CO5** |
| **(OR)** | | | |  | **(OR)** | | |
| 10 b) | Explain B+ tree with Proper example? | **Knowledge** | **CO5** |
| **Group C**  **Answer All the Questions (7 x 5 = 35)** | | | |  | **Group C**  **Answer All the Questions (7 x 5 = 35)** | | |
| 11 a) | Explain Bipartite Graphs with example? | **Knowledge** | **CO1** |
| **(OR)** | | | |  | **(OR)** | | |
| 11 b) | Explain Ski rental problem with its probable solutions? | **Knowledge** | **CO1** |
| 12 a) | A Manufacturer assembles Mobile phones and Laptops. If they sell One Laptop and two Mobile Phone they make a maximum profit of 20,000 rupees. Where as if they sell four Laptop and two Mobile Phones they make profit of 50,000 rupees. In a certain day they sold two Laptops and five Mobile phones. What would be their maximum profit? | **Understand** | **CO2** |
| **(OR)** | | | |  | | **(OR)** | | |
| 12 b) | A Manufacturer makes pens and pencils. If they sell One pen and two pencils, they make a maximum profit of 30 rupees. Where as if they sell four pens and two pencils, they make profit of 60 rupees. In a certain day they sold two pens and five pencils. What would be their maximum profit? | **Understand** | **CO2** |
| 13 a) | Find the items to be included to maximize the profit using 0/1 Knapsack Problem. The Size of the bag is 8,   |  |  |  |  |  | | --- | --- | --- | --- | --- | | **Item No** | **1** | **2** | **3** | **4** | | **Cost** | 5 | 10 | 3 | 6 | | **Size** | 2 | 3 | 1 | 5 | | **Understand** | **CO3** |
| **(OR)** | | | |  | | **(OR)** | | |
| 13 b) | Find the items to be included to maximize the profit using 0/1 Knapsack Problem. The Size of the bag is 10,   |  |  |  |  |  | | --- | --- | --- | --- | --- | | **Item No** | **1** | **2** | **3** | **4** | | **Cost** | 2 | 4 | 13 | 6 | | **Size** | 3 | 2 | 2 | 8 | | **Understand** | **CO3** |
| 14 a) | Draw the subset tree and find out the **sequences** of numbers to be included in binary format to achieve the summation as 30 from the given list of values.  W={5,10,12,13,15,18}  N=6  M=30 | **Understand** | **CO4** |
| **(OR)** | | | |  | | **(OR)** | | |
| 14 b) | Draw the subset tree and find out the **sequences** of numbers to be included in binary format to achieve the summation as 40 from the given list of values.  W={1,2,5,10,15,23}  N=6  M=40 | **Understand** | **CO4** |
| 15 a) | Generate the sequence using move front Algorithm  L= P P O T T Y I I E Y | **Knowledge** | **CO4** |
| **(OR)** | | | |  | | | **(OR)** | | |
| 15 b) | Generate the sequence using move front Algorithm  L= A A E B B G K H H D | **Knowledge** | **CO4** |
| 16 a) | Find out the Transitive closure of the following graph | **Knowledge** | **CO5** |
| **(OR)** | | | |  | | | **(OR)** | | |
| 16 b) | Find out the Transitive closure of the following graph | **Knowledge** | **CO5** |
| 17 a) | Find out the shortest path for Travelling salesman person using bound and branching?  inf: infinite value (you can use the symbol) | **Knowledge** | **CO5** |
| **(OR)** | | | |  | | | **(OR)** | | |
| 17 b) | Prove that Clique is NP-Hard. | **Remember** | **CO5** |