

**SRM Institute of Science and Technology Set C**

**College of Engineering and Technology**

**School of Computing**

SRM Nagar, Kattankulathur – 603203, Chengalpattu District, Tamil Nadu

**Academic Year: 2022-23 (Even)**

**Test: CLA-T1** **Date: 13-02-2023**

**Course Code & Title: 18CSC204J Design and Analysis of AlgorithmsDuration:**60 mins

**Year & Sem: II Year / IV Sem** **Max. Marks:**25

**Course Articulation Matrix:**

|  |  |  |  |  |  |  |  |  |  |  |  |  |
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| **Course Outcome** | **PO1** | **PO2** | **PO3** | **PO4** | **PO5** | **PO6** | **PO7** | **PO8** | **PO9** | **PO10** | **PO11** | **PO12** |
| **CO1** | ***2*** | ***3*** | ***-*** | ***-*** | ***-*** | ***-*** | ***-*** | ***-*** | ***-*** | ***-*** | ***-*** | ***-*** |
| **CO2** | ***-*** | ***3*** | ***2*** | ***-*** | ***-*** | ***-*** | ***-*** | ***-*** | ***-*** | ***-*** | ***-*** | ***-*** |
| **CO3** | ***-*** | ***3*** | ***3*** | ***-*** | ***-*** | ***-*** | ***-*** | ***-*** | ***-*** | ***-*** | ***-*** | ***-*** |
| **CO4** | ***3*** | ***2*** | ***3*** | ***-*** | ***-*** | ***-*** | ***-*** | ***-*** | ***-*** | ***-*** | ***-*** | ***-*** |
| **CO5** | ***2*** | ***3*** | ***-*** | ***-*** | ***-*** | ***-*** | ***-*** | ***-*** | ***-*** | ***-*** | ***-*** | ***-*** |
| **CO6** | ***-*** | ***2*** | ***3*** | ***-*** | ***-*** | ***-*** | ***-*** | ***-*** | ***-*** | ***-*** | ***-*** | ***-*** |

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| **Part – A(5 x 1 =5 Marks)**  **Instructions: Answer all** | | | | | | |
| **Q. No** | **Question** | **Marks** | **BL** | **CO** | **PO** | **PI Code** |
| 1 | \_\_\_ notation is useful for expressing the lower bound of the complexity function  a) O big oh **b) Ω big omega**  c) Θ theta notationd) o little oh | 1 | 1 | 1 | 2 | 2.3.1 |
| 2 | There are three algorithms A1, A2, A3 to solve the given problem with the order nlogn, √n, and logn respectively. Which one is the correct order of increasing growth?  a) **log n, √n, nlogn** b) log n, nlogn , √n  c) nlog n, √n, logn d) √n, nlogn, log n | 1 | 2 | 1 | 2 | 2.1.1 |
| 3 | How many number of comparison are required in insertion sort if the file is already sorted?  a) N **b)** **N-1** c) N+1d) N2 | 1 | 2 | 1 | 2 | 2.3.1 |
| 4 | What does the algorithmic analysis count?  **a) The number of operations that are required to run the program**  b) The number of lines required by the program  c) The number of seconds required by the program to execute  d) Counting the average memory needed by the algorithm | 1 | 1 | 1 | 2 | 2.1.1 |
| 5 | There are four algorithms A1, A2, A3, A4 to solve the given problem with the order log(n), nlog(n), log(log(n)) and n/log(n) respectively. Which is the best algorithm?  a) A1b) A2 **c) A3** d) A4 | 1 | 2 | 1 | 2 | 2.2.2 |
| Part – B(2 x 10 Marks = 20 Marks)  Instructions: Answer any 2 Questions | | | | | | |
| 6 | We have a list of pairs (“Ashwin”,82),(“Sumati”,12), (“Tanuja”,59), (“Brinda”,45), (“Shabana”,72), (“Vijay”,51)], where each pair consists of a student’s name and his/her marks in a course. Suggest the suitable sorting algorithm that would take lesser number of swaps and also explain the best- and worst-case scenarios with time complexities.  **Ans:**  Insertion Sort pseudocode (5)  insertion sort.JPG  Sorted: 12 45 51 59 72 82  Dry run: (3)  Time Complexity Analysis: (2)  Best case - O(n)  Worst case - O(n^2) | 10 | 3 | 1 | 2 | 2.2.3 |
| 7 | Determine the time complexity by generating recurrence relation of a given pseudocode.  fun check (int n)  {  if(n>0)  {  for(i=0;i<n;i++)  {  printf(“%d”,n)  }  check(n-1)  }  } | 10 | 3 | 1 | 2 | 2.3.2 |
| 8 | (i)Given f(n)=3n3+3n+4; g(n)=n3. Show that f(n)=O(g(n)) and g(n)=Ω(f(n)) by exhibiting the values of c and n0.    (ii) Examine the following pseudocode and calculate the time complexity using operation count method.  Begin  sum=0;  for (i=1;i<n;i++)  for (j=i;j<=n;j++)  sum++;  end for  end for  end  **Ans:**  TC= n(n-1)/2 = O(n^2) | 5  5 | 3  3 | 1  1 | 2  2 | 2.3.2  2.2.2 |

**\*Program Indicators are available separately for Computer Science and Engineering in AICTE examination reforms policy.**

**Course Outcome (CO) and Bloom’s level (BL) Coverage in Questions**

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**Approved by the Audit Professor/Course Coordinator**