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## School of Computing Science and Engineering

Bachelor of Technology in Computer Science and Engineering

Mid Term Examination - Nov 2023

Duration : 90 Minutes

Max Marks : 50

### Sem III - E2UC303B - Data Structures

General Instructions

Answer to the specific question asked

Draw neat, labelled diagrams wherever necessary

Approved data hand books are allowed subject to verification by the Invigilator

- 1) The minimum number of comparisons required to determine if an integer appears more than  $(n/2)$  times in a sorted array of 'n' integers is (\_\_\_\_). K1 (1)
- 2) Suppose an array,  $A[-10 \dots +2]$  having Base address (BA) = 999 and size of an element = 2 bytes, find the location of  $A[-1]$ . K2 (2)
- 3) Write a Java program to calculate the average value of array elements. K3 (3)
- 4) Write a pseudocode or Java program to find the maximum and minimum value of an array. K3 (6)
- 5) Suppose a 3-D array A is declared using  $A[1:10, -5:5, -10:5]$ . (i) Find the length of each dimension and the number of elements in A. (ii) Explain Row-Major order and Column-Major order in detail with explanation formula expression. K3 (9)
- 6) Define the following terms with suitable examples: (i) Time complexity, (ii) Space Complexity, (iii) Asymptotic Notations, (iv) Big O Notations. K4 (8)
- 7) Solve a Tower of Hanoi problem for n disks and 5 towers. K5 (15)
- 8) Write algorithms of Insertion sort. Implement the same on the given numbers: 13, 16, 10, 11 4, 12, 6, 7. K6 (6)