SHIVAJI COLLEGE ,UNIVERSITY OF DELHI
DEPARTMENT OF COMPUTER SCIENCE
INTERNAL Test
(Academic Year 2023-2024)

Name of the course : Bsc. (PS) with Computer Sc. Semester : IV
Name of the paper : Data Structures Faculty Name : Preeti Sharma
Date of Test :05/10/2023 Max. Marks : 25
Duration : 1 hour

Q1. Perform insertion sort on the following list of integers showing your steps :

<44, 23, 51, 5, 61, 89, 2, 55 >

Q2. (a) Convert the following arithmetic expression to postfix showing all the steps :

2 * (5+3)/ (6 - 4)

(b) . Evaluate the following postfix expression showing the contents of stack at each step:

3 2 + 5 / 9 + 2 *

(c) Reverse a input string using a stack . Assume the stack is implemented .

Q3. . (a) Can you perform binary search on the following list . Why ?
< 2, 4, 1, 9, 3, 7>

(b) Perform binary search on this array to search the element 6 and element 10 in the list
< 1, 2, 3, 6, 7, 9 10, 12>

Show each step in detail .what is the number of comparisons needed in both the cases.

Q4. Show how the 2D array mat[3][2] will be constructed from the following 1D array ARR using row major mapping and column major mapping.

ARR [6] = <12, 9, 8, 5, 20, 17>

Considering each integer element takes 2 bytes of storage and the first element is stored at memory address 4000, calculate the address of mat[2][1] for both row and column major mapping. How many bytes are required in total to store the 2D array mat.

Q5.Write a function update (int old, int new) to change the value of an existing element old to new in an array of integers. The function should replace all occurrences of old value with new value.