Shivaji College,University of Delhi
DEPARTMENT OF COMPUTER SCIENCE
INTERNAL TEST
ACADEMIC YEAR 2023-2024

Name of the course : Bsc. (PS) with Computer Sc.
Name of the paper : Data Structures
Date of Test : 09/04//2024.
Duration : 1 hour

Semester : II
Faculty name: Preeti Sharma
Max. Marks : 30

Q1. (a) . State whether the following is true or false : (5)

(i) Queues follow the LIFO discipline .
(ii). Doubly linked list node takes the same memory as a singly linked list node
(iii). Each node of a Binary Tree must have 2 children
(iv) elements of an array are stored in contiguous memory locations
(v). Random access is possible in a linked list .

(b). Sort the following of integers using insertion sort .Report the total number of comparisons. and show the list after every iteration . (5)

45, 20 , 30, 55, 22, 60 , 28

(c). Give any 2 applications of a stack (2)

(d)what is the difference between Binary Tree and a Binary Search Tree . (2)

(e). Consider a function fib() to compute Fibonacci numbers as defined below : (4)

```
Fib ()
{ if ( n<=1 )
    return n
  else return fib (n-1) + fib (n-2)
}
```

How many times will fib() be called if n= 4

(f) Give the class definition for the node of a doubly linked list . (2)

Q2 .. Implement a circular queue using array . Write enqueue and Dequeue . operations As well as functions for full Q , empty Q and SizeofQ . (6)

Q3 Write a function to count the number of nodes in a linked list . Each node of the list has The following structure :

```
Struct Node { int value;
              Node * next ;}.
```

(4)

PS Sharma