PSG COLLEGE OF ARTS & SCIENCE
(AUTONOMOUS)

BSc DEGREE EXAMINATION DECEMBER 2022
(Second Semester)

Branch – COMPUTER SCIENCE

DATA STRUCTURES

Time: Three Hours Maximum: 50 Marks

SECTION-A (5 Marks)
Answer **ALL** questions
ALL questions carry **EQUAL** marks (5 x 1 = 5)

1 Pointer is special kind of variable which is used to store _____ of the variable.
(i) Value (ii) Data type (iii) Address (iv) Variable Name

2 The best case complexity of bubble sort is _____.
(i) O(nlogn) (ii) O(logn) (iii) O(n) (iv) $O(n^2)$

3 In linked list each node contain minimum of two fields. One field is data field to store the data second field is _____.
(i) Pointer to character (ii) Pointer to integer
(iii) Pointer to node (iv) Node

4 _____ data structure is used for implementing recursion.
(i) Queue (ii) Stack (iii) Array (iv) List

5 A binary search tree is formed from the sequence 6, 9, 1, 2, 7, 14, 12, 3, 8, 18. The minimum number of nodes required to be added in to this tree to form an extended binary tree is _____.
(i) 3 (ii) 9 (iii) 10 (iv) 11

SECTION - B (15 Marks)
Answer **ALL** Questions
ALL Questions Carry **EQUAL** Marks (5 x 3 = 15)

6 a What is an array? Explain how it is declared and used in data structure?
OR
b Write the purpose of Sparse Matrices with examples.

7 a Differentiate between merge sort and quick sort?
OR
b Give a brief note on Hashing.

8 a Bring out the advantages of linked list over arrays.
OR
b Construct the Linked List with the elements 10 20 30 40 50 and write the steps to Traverse the list.

Cont...

9 a Explain any two applications of stack with examples.

OR

b Give brief description about the priority queues.

10 a What are the steps to convert a general tree into binary tree?

OR

b Is the heap sort always better than the quick sort? Comment on it.

SECTION -C (30 Marks)

Answer **ALL** questions

ALL questions carry **EQUAL** Marks (5 x 6 = 30)

11 a Explain various types of data structure in detail.

OR

b List out the various String functions and explain any five in detail.

12 a Implement selection sort algorithm to sort the numbers in ascending order
Sort using Selection sort: 89 34 12 7 90 67 44 10 23 54

OR

b Find the location of the element 250 in the list 100 150 200 250 300 350 400 using Binary Search and also write the pseudo code for the same.

13 a Explain the operation of inserting in a linked list. Write the algorithm and give an example.

OR

b Write and explain the algorithm for create, insertion and traverse operations in doubly linked list with example.

14 a Construct an expression tree for the expression (a+b*c) + ((d*e+f)*g). Give the outputs when you apply inorder, preorder and postorder traversals.

OR

b What are the limitations of queue? Explain the algorithms for various operations of circular queue.

15 a What is BST? How do you insert an element into a binary search tree?

OR

b Write about deletion and searching operations on AVL trees.

Z-Z-Z END