

PSG COLLEGE OF ARTS & SCIENCE
(AUTONOMOUS)

MSc (SS) DEGREE EXAMINATION MAY 2023
(Second Semester)

Branch – SOFTWARE SYSTEMS (Five years Integrated)

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 An $m \times n$ matrix is said to be Sparse, if many of its elements are
 - (i) Zero
 - (ii) One
 - (iii) Same
 - (iv) All the above
- 2 When the new element is pushed into a stack, the value of top is?
 - (i) $top = top - 1$
 - (ii) $top = top + 1$
 - (iii) $top = 1$
 - (iv) $top = 0$
- 3 A heap is a
 - (i) left skewed tree
 - (ii) right skewed tree
 - (iii) perfect tree
 - (iv) complete binary tree
- 4 If the searching element is smaller than root node in BST, the search move to
 - (i) right subtree
 - (ii) left subtree
 - (iii) Null
 - (iv) leaf node
- 5 Which sorting technique uses divide and conquer approach?
 - (i) Insertion sort
 - (ii) Bubble sort
 - (iii) Merge sort
 - (iv) Radix sort

SECTION - B (15 Marks)

Answer ALL Questions

ALL Questions Carry EQUAL Marks

(5 x 3 = 15)

- 6 a What is an Abstract Data Type? Define it.
OR
b What is an Array? Lists the operations performed on Array.
- 7 a How the subroutines are handled by using Stack?
OR
b Define priority queue with example.
- 8 a Describe the circular list shortly.
OR
b Convert the expression into its prefix and postfix notation.
 $A + B * C - D$
- 9 a What are steps to be followed to search an element in Binary Search Tree?
OR
b Define Breadth First Traversal in a Graph.
- 10 a Describe about hash Function.
OR
b How to perform merge sort? Specify the steps to be followed.

Cont...

SECTION -C (30 Marks)

Answer **ALL** questions

ALL questions carry **EQUAL** Marks

(5 x 6 = 30)

- 11 a Demonstrate various time complexities through an example.
OR
b Illustrate the Sparse Matrix with example.
- 12 a Elucidate the primitive operations of Stack.
OR
b List out the applications of Queue in detail.
- 13 a Enumerate the Doubly linked list with an example.
OR
b Construct the max Heap tree for the following elements:
44, 33, 77, 22, 66, 22, 55
- 14 a Perform an insertion and deletion operation in the BST.
OR
b Categorize the representation methods of a Graph shortly.
- 15 a Elaborate the successful and unsuccessful search in Hashing method.
OR
b Perform the Insertion sort for the following elements.
12, 34, 21, 45, 55, 23, 11.

Z-Z-Z

END