

PSG COLLEGE OF ARTS & SCIENCE
(AUTONOMOUS)

BSc DEGREE EXAMINATION DECEMBER 2023
(Second Semester)

Branch – COMPUTER SCIENCE WITH DATA ANALYTICS

FUNDAMENTALS OF DATA STRUCTURES/ 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 What is a data structure?
(i) Programming language (ii) A collection of algorithm
(iii) A way to store and organize data (iv) computer hardware
- 2 Which of the following is not a stable sorting algorithm?
(i) Insertion sort (ii) Selection Sort
(iii) Bubble sort (iv) Merge sort
- 3 _____ is the property of Stack.
(i) FIFO (ii) LIFO
(iii) FILO (iv) LOFI
- 4 In doubly linked lists, traversal can be performed?
(i) Single direction (ii) Both direction
(iii) Circular process (iv) reverse direction
- 5 In full binary search tree every internal node has exactly two children. If there are 100 leaf nodes in the tree, how many internal nodes are there in the tree?
(i) 25 (ii) 99
(iii) 55 (iv) 100

SECTION - B (15 Marks)

Answer ALL Questions

ALL Questions Carry EQUAL Marks (5 x 3 = 15)

- 6 a Explain Abstract Data type.
OR
b Discuss on Sparse Matrices.
- 7 a Explain insertion sort with example.
OR
b Discuss on Hashing.
- 8 a Explain Circular Queue.
OR
b Write the steps involved in converting the expression $A+B*C+D$ to postfix expression.

Cont...

- 9 a Write the algorithm to add an element in linked list.
OR
b Distinguish between single linked list and Double linked list.
- 10 a Explain basic terminology in Trees.
OR
b Explain applications of Trees.

SECTION -C (30 Marks)

Answer ALL questions

ALL questions carry EQUAL Marks

(5 x 6 = 30)

- 11 a Elucidate Linear array with suitable example.
OR
b Discuss on Algorithm Complexity.
- 12 a Examine the array $a[] = \{64, 25, 12, 22, 11\}$ and explain steps in selection sort.
OR
b Explain bubble sort with example.
- 13 a Explain the various operation in Queue.
OR
b Explain the various operation in Stack.
- 14 a Write an algorithm for adding and deleting element in doubly linked list.
OR
b Explain Single linked list and write an algorithm to search an element in linked list.
- 15 a Elucidate tree traversal with example.
OR
b Explain AVL search Trees.

Z-Z-Z

END