SLR-JE-297

Seat No.

Set R

S.Y. (B.Tech. Electronics & Computer Engineering) (Sem - I) (New) (NEP CBCS) Examination: October/November – 2025
Data Structures and Algorithms (ECEPCC-02)

Day & Date: Wednesday, 17-12-2025 Max. Marks: 70
Time: 03.00 PM To 06.00 PM

Instructions: 1) Q. No. 1 is compulsory. It should be solved in the first 30 minutes in Answer Book Page no 03 (Starting page of the Answer Book). Each question carries one mark.
2) Don't forget to Mention question paper set (P/Q/R/S) on top of page.
3) Figures to the right indicates full marks.
4) Assume suitable data whenever necessary.

MCQ/Objective Type Questions

Duration: 30 Minutes Marks: 14

Q.1 Choose the correct alternatives from the options and rewrite the sentence. **14**

1) In Dijkstra's algorithm, what is the initial distance assigned to all vertices except the source?
a) 0 b) −1
c) Infinity d) 1

2) What is the primary difference between BFS and DFS in terms of node exploration?
a) DFS uses a queue
b) BFS uses a stack
c) BFS explores neighbors level by level, DFS goes as deep as possible
d) DFS guarantees shortest path

3) Binary search can only be applied on _____.
a) Unsorted arrays b) Arrays with duplicate elements
c) Sorted arrays d) Any array

4) Heap Sort uses which data structure?
a) Queue b) Heap
c) Stack d) Tree

5) An Abstract Data Type (ADT) is _____.
a) A data structure with fixed storage size
b) A theoretical concept that defines operations but not implementation
c) A function in C language
d) An array with hidden elements B

6) Which is not an operation of a stack ADT?
a) push
b) pop
c) peek
d) search all D

7) The last node in a singly linked list points to _____.
a) NULL
b) First node
c) Random memory location
d) None of the above

8) Which function in C is used to allocate memory for a new linked list node?
a) malloc()
b) alloc()
c) memalloc()
d) new()

9) A node in a doubly linked list contains _____.
a) One pointer and data
b) Two pointers and data
c) Data only
d) Three pointers and data

10) Which data structure follows the FIFO (First In First Out) principle?
a) Stack
b) Queue
c) Graph
d) Tree

11) Which of the following is not an operation on stack?
a) Push
b) Pop
c) Peek
d) Enqueue

12) An AVL tree is a BST that maintains _____.
a) Height balance
b) Node balance
c) Leaf balance
d) Weight balance

13) The maximum number of nodes at level k in a binary tree is _____.
a) k
b) 2^k
c) 2^(k−1)
d) k^2

14) The nodes with no children in a tree are called _____.
a) Roots
b) Leaves
c) Parents
d) Internal nodes

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Data Structures and Algorithms (ECEPCC-02)

Day & Date: Wednesday, 17-12-2025 Max. Marks: 56
Time: 03:00 PM To 06:00 PM

Instructions: 1) All questions are compulsory.
2) Figures to the right indicate full marks.
3) Assume suitable data whenever necessary.

SECTION – I

Q.2 Solve Any Four of the followings. **16**

a) Define Algorithm. Explain its features.

b) Define data structure. Explain its types along with example.

c) Explain any two applications of stack in detail with example.

d) What is stack data structure? Describe all its operations.

e) Differentiate between Singly linked list and doubly linked list.

Q.3 Solve Any Two of the followings. **12**

a) Write a C program to perform the traversing, insertion and deletion operation on Array.

b) Write a C program to implement Enqueue, Dequeue and Display Operations on Queue.

c) Explain with the help of diagram Singly Linked Lists
i) Node Structure
ii) Inserting a node at the end
iii) Deleting a node from Beginning

SECTION – II

Q.4 Solve Any Four of the followings. **16**

a) What is Heap sort and Sort the list of numbers using Heap sort?
25, 35, 18, 9, 46, 70

b) Explain different Binary tree terminology.

c) Explain the AVL Tree four categories of rotations. (LL, RR, RL & LR)

d) Explain the Breadth First Search (BFS) traversal technique of Graph.

e) Explain the Adjacency Matrix and Adjacency List representation of Graph.

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Q.5 Solve Any Two of the followings.

a) Write a program to enter n numbers in an array. Redisplay the array with elements being sorted in ascending order using Bubble Sort.

b) Write C program for following binary search tree operation.

i) Insertion

ii) Deletion

c) Consider the graph G given in Fig. Taking 1 as the initial node, execute the Dijkstra's algorithm on it to find the shortest path between 1 (source node) and every other node.