

S.E. ECS SEM III C-Scheme June 2026.

Duration: 3hrs

[Max Marks: 80]

11/06/26

- N.B. : (1) Question No 1 is Compulsory.
 (2) Attempt any three questions out of the remaining five.
 (3) All questions carry equal marks.
 (4) Assume suitable data, if required and state it clearly.

- 1 Attempt any **FOUR** [20]
 - a What is a data structure? Difference between primitive data structure and non-primitive structure. [5]
 - b What is a graph? Explain the various ways to represent graph in the memory with example. [5]
 - c A hospital manages patient treatment based on emergency and arrival order: [5]
 1. Identify which type of queue is suitable if patients are treated strictly in order of arrival.
 2. Identify which type of queue is suitable if patients with more critical conditions are treated first.
 3. State the time complexity (Big-O) for enqueue and dequeue operations in each queue type.
 - d Explain collision handling techniques. [5]
 - e Draw expression tree for the following expression: [5]

$$(((a - b) + 2) / ((c - d) * e) + f)$$
- 2 a What is Huffman coding? Construct Huffman tree for the letters in the string "structures" and find the Huffman codes for each symbol in the string.. [10]
 - b Write a C program to implement following operations of stack using arrays: PUSH, POP, PEEK, STACK_EMPTY, STACK_FULL and DISPLAY. [10]
- 3 a Write a C program to perform following operations on a doubly linked list: [10]
 - i) Insert a node from the end of the list,
 - ii) Delete first node,
 - iii) Display the list.
 - b Write an algorithm to convert infix expression to postfix expression using stack. [10]

Convert the given infix expression into equivalent postfix expression using stack.

$$A + (B * C - (D / E - F) * G) * H$$

- 4 a Write a pseudocode algorithm for [10]
1. Inserting a node in the tree
2. Inorder traversal.
- b What is a Binary Search Tree? Design a Binary Search Tree for the following [10]
elements: 12, 7, 9, 10, 22, 24, 30, 18, 3, 14, 20.
- 5 a Write a short note on BFS and DFS algorithm. [10]
- b Write an algorithm for binary search and linear search. Compare binary search [10]
and linear search algorithm with respect to time complexity.
- 6 a What are the different sorting techniques? Sort the following elements 56, 57, [10]
92, 38, 44, 90, 61, 73 using Bubble sort and selection sort algorithm.
- b Write a code for inorder binary tree traversal and Build a Binary Search Tree, by [10]
using following sequences:
Inorder: 35, 41, 48, 52, 57, 72, 79, 85, 86, 90
Preorder: 57, 41, 35, 52, 48, 90, 72, 85, 79, 86
