

**Third Semester BE Degree Examination November 2020
(CBCS Scheme)**

Time: 3 Hours

Max Marks: 100 marks

Sub: Data Structures using C**Q P Code: 60303****Instructions:** 1. Answer **five full** questions.

2. Choose one full question from each module.

3. Your answer should be specific to the questions asked.

4. write the same question numbers as they appear in this question paper.

5. Write Legibly

Module – 1

- 1 a List and explain the Operations that can be performed on arrays? 8 marks
- b What is polynomial? What is the degree of polynomial? Write a function to add two polynomials. 8 marks
- c What is primitive and non primitive data structures with example. 4 marks

Or

- 2 a List and explain the different types of dynamic memory allocation functions with syntax and suitable examples. 10 marks
- b Differentiate between Structure and Union with example. 6 marks
- c Define the following: 4 marks
- Pointer constants
 - Pointer values
 - Pointer variable
 - Dangling pointer

Module – 2

- 3 a Write the postfix form of the following expression using stack. 6 marks
- $a * b - c - d - e f (g + h)$
 - $a - b (c * d * e)$
- b What is recursion? What are the various types of recursion? 6 marks
- c Implement addq and delete functions for the circular queue. 8 marks

Or

- 4 a Define Queue. Give the C implementation of insert and delete element from a queue. 7 marks
- b Write a C program to implement Tower of Hanoi problem using recursive function. 6 marks
- c Give a node structure for the sparse matrix. Write a linked representation for the given sparse matrix? 7 marks

$$A = \begin{bmatrix} 2 & 0 & 0 & 0 \\ 4 & 0 & 0 & 3 \\ 0 & 0 & 0 & 0 \\ 8 & 0 & 0 & 1 \\ 0 & 0 & 6 & 0 \end{bmatrix}$$

PTO

Module – 3

- 5 a Write a C program to implement insertion and deletion operation on queue using linked list. 10 marks
b Define stack. Give the C implementation of PUSH and POP operation using stack. 7 marks
c Define linked list. List its types. 3 marks

Or

- 6 a Write a C program to implement QUEUE operations using single linked list. 10 marks
b Differentiate between single linked list and double linked list. 6 marks
c For the given sparse matrix and its transpose, give the triplet representation, A is the given sparse matrix, B will be its transpose 4 marks

$$A = \begin{bmatrix} 11 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 3 & -2 & 0 & 24 \\ 0 & 7 & 0 & -6 & 0 & 0 \\ 34 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 16 & 0 & 0 & 0 & 0 \end{bmatrix}$$

Module – 4

- 7 a What is Binary tree? State its properties. How it is represented using array and linked list. Give example. 10 marks
b Define Traversals. What are the different traversal techniques of a binary tree explain with its Functions. 10 marks

Or

- 8 a Describe binary search tree with an example. Write a recursive function to search for a key value in a binary search tree. 10 marks
b Draw the binary search tree for the following list 14, 15, 4, 9, 7, 18, 3, 5, 16, 4, 20, 17, 9, 14, 5. 7 marks
c What are the applications of Trees? 3 marks

Module – 5

- 9 a Define Graph? What are the different methods of representing a graph? Give example. 8 marks
b What is DFS? Briefly explain the traversal of DFS with example. 6 marks
c Write a short note on Static and Dynamic hashing. 6 marks

Or

- 10 a What is Hashing function and what are its types explain with example. 8 marks
b What are the basic operations that can be performed on files? Explain briefly 8 marks
c Write a brief note on Elementary graph operation. 4 marks
