

October 2025
B.A./B.Sc.
Third Semester
MAJOR – 4
COMPUTER SCIENCE
Course Code: CSM 3.21
(Data Structures)

Total Mark: 50
Time: 2 hours

Pass Mark: 20

I. Answer the following questions.

1. (a) Write a program that generates n^{th} Fibonacci term using recursion. 5
(b) What is data structure? Explain the different types of data structure. 1+6=7

OR

2. (a) Explain the various operations on arrays. 5
(b) What is recursion? Explain the various types of recursion. 1+6=7

3. (a) Sort the following array in ascending using insertion sort method: 3

10	7	8	2	6	70	1
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- (b) Write the function definition to delete element from an array. 4
(c) Convert postfix expression to infix expression: 5
 $K+L-M*N+(O^P)*W/U/V*T+Q$

OR

4. (a) Write algorithm to evaluate postfix expression. 4
(b) Write algorithms for push and pop operations of stack. 4
(c) MAT is a two-dimensional array with 7 rows and 6 columns. Each element occupies 4 (four) memory locations. If MAT[1][1] begins at address 3000, find the location of MAT[3][4]. The arrangement of the elements is row-major. 4

5. Explain the different memory allocation and deallocation built-in functions in dynamic memory allocation. 12

OR

6. (a) Explain the different types of linked list with suitable diagrams. 6
(b) Write a program to create singly linked list. 6

II. Answer any two of the following questions.

7. What is an algorithm? Write some characteristics of an algorithm.
Explain performance analysis of algorithm. 1+4+2=7
8. What is a queue? Explain double-ended queue and priority queue. 1+6=7
9. Write down differences between static memory allocation and dynamic memory allocation. Explain self-referential structures. 4+3=7
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