

12. (a) (i) What is a structure? Write a C program to add and subtract the two complex numbers using structures. (8)
(ii) Explain the concept of random access files with an example. (8)

Or

- (b) Store ten names of students in a file called 'data .txt'. Perform operations to sort their names alphabetically. Write the sorted names into another file called 'names .txt'. Display the names from 'names .txt' by opening the file in read mode. Close the files after performing all operations. (16)

13. (a) What is singly linked list? Write a C program that uses functions to perform the following operation on singly list with suitable diagrammatic representations. Consider all cases:
(i) Insertion (ii) Deletion (iii) Traversal in both ways. (16)

Or

- (b) Illustrate the necessary algorithms to implement doubly linked list and perform all the operations on the created list. (16)

14. (a) Develop an algorithm to implement Stack ADT. Give relevant examples with diagrammatic representations. (16)

Or

- (b) (i) Write an algorithm to implement circular queue using arrays. (10)
(ii) Show the simulation using stack for converting the expression $p*q+(r-s/t)$ from infix to prefix. (6)

15. (a) (i) Sort the given integers and show the intermediate results using selection sort. 45, 25, 10, 2, 9, 85, 102, 1. (8)
(ii) Write a C code to sort an integer array using selection sort. (8)

Or

- (b) What is hashing? Explain open addressing and separate chaining methods of collision resolution techniques with examples. (16)