

**B. E. Third Semester (Computer Technology) / BECT – 18-19 – Rev – SoE  
– CT-201 Examination**

**Course Code : CT 2204**

**Course Name : Data Structures**

Time : 2 Hours]

[ Max. Marks : 40

**Instructions to Candidates :—**

- (1) Attempt any **Four** questions out of **Six**.
- (2) All questions carry **Ten** marks.
- (3) Assume suitable data wherever necessary.
- (4) Due credit will be given to neatness and adequate dimensions.
- (5) Illustrate your answers wherever necessary with the help of neat sketches.

1. (A) Solve any **One** :— 5(CO1)  
(A1) Write a program to find Fibonacci series up to n terms using recursion.  
(A2) Discuss block scope and function scope rule of a variables.  
(B) Solve any **One** :— 5(CO1)  
(B1) Differentiate between call by value and call by reference.  
(B2) Compare recursion and iteration.
2. (A) Solve any **One** :— 6(CO1)  
(A1) Write a c program to search an element in an array using linear search.  
(A2) Write an algorithm for quicksort technique.  
(B) Solve any **One** :— 4(CO1)  
(B1) Write a program to delete an element in an array at specified position.  
(B2) Write the step wise execution process for sorting the following array using Mergesort :  
          { 80 , 62 , 51 , 0 , 80 , 25 }

3. (A) Solve any **One** :— 5(CO1)
- (A1) Write a program for creation array of structures in C. Declare the student structure with data members for student name and marks scored in various subjects of MSE II. Display the information of N number of students.
- (A2) Write a program to find sum of two complex numbers using structures.
- (B) Solve any **One** :— 5(CO1)
- (B1) Write a program for addition of two nos. using function pointer.
- (B2) Write a c program which initialize an integer array for marks [3]={10,20,30} and display this information using pointer to an array.
4. (A) Solve any **One** :— 6(CO2)
- (A1) Write a c program to accept an array elements dynamically and print its sum.
- (A2) Differentiate between static and dynamic memory allocation.
- (B) Solve any **One** :— 4(CO2)
- (B1) Given two polynomials represented by two arrays, write a function that adds given two polynomials.  
Example :  
Input : A [] = {15 , 0 , 1 , 5}  
          B [] = {10 , 2 , 14}  
Output : sum [] = {25 , 2 , 15 , 5}
- (B2) Write a program to dynamically allocate memory for two dimensional array. Display it.
5. (A) Solve any **One** :— 6(CO3)
- (A1) Write a c program to perform pop(), peek() and display() operation for a stack using array.
- (A2) Convert following infix expression to prefix expression without using stack. Show all steps.  
$$K + L - M * N + (O \wedge P) * W / U / V * T + Q$$

- (B) Solve any **One** :— 4(CO3)
- (B1) Convert the following expression into infix to postfix. Also show contents of stack in each step.  
 $(A + (B * C - (D / E^{\wedge}) * G))$
- (B2) Write an algorithm for evaluation of postfix expression. Also evaluate :  
 $5\ 3\ +\ 6\ 2\ /\ * \ 3\ 5\ *\ +$
6. (A) Solve any **One** :— 6(CO4)
- (A1) What do you mean by query ? Discuss its different types by giving suitable example.
- (A2) Discuss Trie indexing technique.
- (B) Solve any **One** :— 4(CO4)
- (B1) Explain different random file organization techniques.
- (B2) Discuss hash indexing technique. What are the different methods available for handling overflow in hash indexing technique ?

