

**Data Processing and Computer Applications  
(MT 504)**

**Full Marks: 70**

**Time: 3 hrs**

*Use SINGLE answer script for answering of all questions.  
Answer any SEVEN questions.*

1. Write a program which read the distinct words in its input from a data file and sort the words into decreasing order of frequency of occurrence. Print each word preceded by its count  
[10]
2. Write a program using pointers to read and sort student names in alphabetical order from a list and store the data in a data file  
[10]
3. Write a program which will scan a character string from a data file 'DATA' and display all the lower case characters into their upper case equivalent  
[10]
4. A positive integer is entered through the keyboard in the *main()* part of the program, write a program using recursive function to find the followings and print the same from the *main()*.  
(a) Binary equivalent of this number.  
(b) Factorial of this number.  
[10]
5. Write a function to calculate the roots of a quadratic equation. The function must use two pointer parameters, one to receive the values of coefficients and the other to send the roots to the calling function.  
[10]
6. Using structure variables, write a C program that reads several different names, addresses and telephone numbers into the computer in a user-defined function (say, *read()*), rearranges the names into alphabetical order in another user-defined function (say, *arrange()*) and then print name in the alphabetical order along with all other information in a separate user-defined function (say, *out\_put()*).  
[10]

7. Write a function that receives  $n$  integers and returns the sum, average and standard deviation of these numbers. Call this function from *main()* and print the results in *main()*. [10]

8. Answer the following questions:

- (i) What is the difference between call by value and call by reference?
- (ii) How can you retrieve the value of  $a[2][3]$  by using pointer? Suppose the array is defined as  $a[3][4]$ .
- (iii) How dose structure and union differ?
- (iv) What is the difference between 'malloc' and 'calloc'?
- (v) Why do we need a terminating null character to store a string in array?

[2x5=10]

9. Differentiate:

- (i) Analog and Digital computer
- (ii) RAM and ROM
- (iii) Input and output device
- (iv) SRAM and DRAM
- (v) Serial and Parallel port

[2x5=10]

10. Answer the following questions:

- (i) State the role of control unit to execute and instruction
- (ii) Define I-time and E-time with reference to Machine cycle
- (iii) Write different types of CPU registers and their functions
- (iv) State the importance of RAM in a computer
- (v) What is virtual memory?

[2x5=10]