

Time Allotted: 3 hours

Full Marks: 70

The questions are of equal value.

The figures in the margin indicate full marks.

Candidates are required to give their answers in their own words as far as practicable.

**Answer any five Questions**

- 1.a) What are the different data types available in C ? Mention the storage space requirement for each of them.
- b) Why '&' is used in case of a scanf ( ) statement in C, while it is not used in printf ( ) statement ?
- c) How can you cause the % symbol to be printed in printf ( ) statement?
- d) Write a program in C to accept three integer numbers as the length of three sides of a triangle, test the validity of lengths and classify the triangle.

- 2.a) What are the loop control structures used in C language ? What is the difference between while and do . . while loop ?
- b) Convert the mathematical expression into C expression.

$$\sqrt{1+x} + \frac{\log \cos 2x}{1+|y|}$$

- c) What is operator precedence ? Explain the associativity of unary operators.
- d) Compare the purpose of "break" statement with that of exit ( ). When do we use "continue" statement ?

- 3.a) Write C program to implement the following library function in C 3  
(i) Strlen ( ) (ii) Strcpy ( ) (iii) Strcat ( )

- b) Write a program in C that computes the sum of the following series :

$$x - \frac{x^3}{3!} + \frac{x^5}{5!} - \frac{x^7}{7!} + \dots \dots \dots \text{to } n \text{ terms.}$$

The value of x and n is to be given by the user.

- 4.a) Write a program in C that takes a string as input and find out the frequency of each character in the string.

- b) write the difference between call by value and call by reference. 3
- c) Write a C program to perform addition, subtraction & multiplication on two matrices depending upon user's choice. 7
- 5.a) What is function ? 2
- b) Can it be possible to send an entire array to a function ? Explain. 3
- c) Write a program to display a Pascal's triangle. 5
- d) Write a program to find the largest of a list of numbers using function. 4
- 6.a) Explain with a suitable example the functionality of ternary operator in C. 4
- b) What is recursion ? How it differs from iteration? Explain. 2+4
- c) Using recursive function solve the following problem. 4
- The Legendre polynomials can be calculated by means of the following formulas :
- $$P_0 = 1, P_1 = x,$$
- $$P_n = [(2n - 1)/n] \times P_{n-1} - [(n-1)/n] \times P_{n-2}$$
- where  $n = 2, 3, 4 \dots$  and  $x$  is any floating point number between  $-1$  and  $1$ . Generate the first  $n$  Legendre polynomials. Let the values of  $n$  and  $x$  be input parameters.
- 7.a) What is the difference between a structure variable & a union variable ? What is the use of tag ? Is it necessary to mention it always ? Write a program by using structure that describes the set of books in a library. For each book the members are name of author, publisher, rate & branch information. 9
- i) Print a list of books supplied by a publisher.
- ii) Print a list of books in a particular branch.
- b) What is meant by the scope of a variable within a program ? 3
- c) What is the purpose of an external variable ? What is its scope ? 2
- 8.a) What is the use of C preprocessor ? What is macro ? 4
- b) Discuss Pointer arithmetic. 2
- c) What is the primary advantage of using a data file ? 2
- d) Write a program in C which compares two files and print the lines where they differ ? 6
- 9.a) What do you mean by dynamic memory allocation. 2
- b) Critically compare between malloc ( ) and calloc ( ) function. 4
- c) Write a program in C to read two different dates in DD/MM/YYYY format . The program should check if the dates 8

are valid. If both are valid, then output the number of days in between them, otherwise give an error message. For example, if the dates are 01/03/2003 and 31/03/2003, the output will be 30.

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