

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.
