U.G. 3rd Semester Examination - 2024
MATHEMATICS
[Skill Enhancement Course (SEC)]

Course Code : MATH-SEC-T-03

(Programming in C)

[NEP-2020]

Full Marks : 35   Time : $1\frac{1}{2}$ Hours

The figures in the right-hand margin indicate marks.

Sysmbols and notations have their usual meanings.

1. Answer any **five** questions: 1×5=5

    a) Convert $(101101)_2$ to hexadecimal.

    b) Perform the binary subtraction of 1101 and 1011.

    c) Write a simple algorithm to find the largest of three numbers.

    d) Explain the difference between = and == in C.

    e) Identify and correct the error:
        ```
        int arr[5] = {1,2,3,4,5};
        for (int i = 0; i <= 5; i + +)
        {
        \printf("%d", arr[i]);
        }
        ```

[Turn over]

f) Write a C program that takes an integer as input from the user and checks whether it is even or odd.

g) Differentiate between 'while' and 'do-while' loops with an example.

h) Convert $(-7)_{10}$ to its 8-bit two's complement binary representation.

2. Answer any **two** questions: 5×2=10

a) Discuss the key features of flowcharts. Draw a flowchart to check if a given number is prime.

2+3

b) Write a C program to find the largest element in a one-dimensional array. 5

c) Explain recursion in C. Write a recursive function to compute the factorial of a number.

2+3

d) Write a C program to print Fibonacci series using a 'for' loop. 5

3. Answer any **two** questions: 10×2=20

a) i) Explain arithmetic, relational and logical operators in C with examples. 5

ii) Write the syntax to declare and initialize a two-dimensional array. Hence write a C program to multiply two 3×3 matrices.

2+3

b) i) Differentiate between iteration and recursion with examples. 5

ii) Write a C program to compute the g.c.d. of two numbers using recursion. 5

c) i) Explain how C can be used to approximate the sum of a convergent infinite series.

5

ii) Write a C program to compute the sum of the infinite series

$$S = 1 - \frac{1}{2} + \frac{1}{3} - \frac{1}{4} + \frac{1}{5} - \cdots$$

5

d) Write short notes on the following:

i) Bubble sort 5

ii) Debugging in C 5

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