

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.**Symbols and notations have their usual meanings.*1. Answer any **five** questions: $1 \times 5 = 5$

- 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: $5 \times 2 = 10$

- 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: $10 \times 2 = 20$

- 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

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

5

- d) Write short notes on the following:

- i) Bubble sort

5

- ii) Debugging in C

5