

U.G. 3rd Semester Examination - 2025**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 $(1011011)_2$ to decimal.
 - b) Perform the binary subtraction of $10010 - 01101$.
 - c) Write a simple algorithm to check whether a given number is a palindrome.
 - d) Write a simple algorithm to find the largest of three given numbers.

[Turn over]

- e) Identify the error(s) in the following C program:

```
#include <stdio.h>
int main ()
{
    int i = 0;
    while(i < 5)
    printf("%d ", i);
    return 0;
}
```

- f) Write a C program to check whether a given year is a leap year or not.
- g) Differentiate between scanf() and gets() functions in C.
- h) Represent $(-18)_{10}$ in 8-bit two's complement binary form.
- i) If a storage device has a capacity of 2.5 GB, calculate its size in BYTES.

2. Answer any **two** questions: $5 \times 2 = 10$

- a) Explain the concept of an algorithm. Write an algorithm to find the sum of first n natural numbers. $2+3$
- b) Write a C program to count the number of even and odd elements in an array. 5
- c) Explain the purpose of header files in C. Give examples of two header files. 5

- d) Write a C program to reverse a given number using a while loop.

3. Answer any **two** questions: $10 \times 2 = 20$

- a) i) Explain arithmetic, relational, and logical operators in C with appropriate examples. 5
- ii) Write the syntax for declaring and initializing a two-dimensional array. Hence write a C program to compute the transpose of a 3×3 matrix. $2+3$
- b) i) Define recursion. Explain the basic structure of a recursive function with an example. 5
- ii) Write a recursive C function to find the n -th Fibonacci number. 5
- c) i) Explain how loops are used for repetitive computations in C: 5
- ii) Write a C program to calculate the sum of the series $S = 1^2 + 2^2 + 3^2 + \dots + n^2$. 5
- d) Write short notes on the following:
- i) Merge sort 5
- ii) Types of errors in C (syntax, runtime, and logical errors). 5