

**U.G. 3rd Semester Examination - 2024****MATHEMATICS****[HONOURS]****Skill Enhancement Course (SEC)****Course Code : MATH-H-SEC-T-1A&B****[CBCS]****Full Marks : 40****Time : 2 Hours***The figures in the right-hand margin indicate marks.**Symbols and notations have their usual meanings.***Answer all the questions from Selected Option.****OPTION-A****MATH-H-SEC-T-1A****(Programming in 'C')**

1. Answer any five questions:  $2 \times 5 = 10$
- a) Explain do-while loop in C with a suitable example.
  - b) Explain the coding schemes ASCII and EBCDIC.
  - c) Explain the use of scanf() and printf() functions in a C program.
  - d) Differentiate between Data and Information.
  - e) Explain two types of numeric constants with examples.

*[Turn over]*

f) What will be the output of the following C code?

```
include<stdio.h>
```

```
int main()
```

```
{
```

```
  a=10;
```

```
  printf("%d,%d,%d,%d\n", a++, ++a, a--, --a);
```

```
  printf("%d",a);
```

```
  return 0;
```

```
}
```

g) What are the properties that an Algorithm should have?

h) Find  $x$  and  $y$ , Where  $(x.y)_{10} = (10111.1101)_2$

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

a) Illustrate function prototype in C with a suitable example. Define a function in C to compute GCD of two positive integers.  $3+2$

b) Write the syntax of for-loop in C. Write a C program to find Fibonacci numbers using for-loop.  $1+4$

c) What are the differences between User-defined and Standard Library functions in C? Explain with a suitable example.  $3+2$

d) What are break and continue statements in C? Explain with a suitable example.  $2+3$

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

a) i) Write a C program to print the largest of three real numbers.

ii) What do you mean by local and global variables in C? Explain with suitable example.

iii) Write a C program to find whether a given year is leap year or not.  $3+(2+2)+3$

b) i) Write the differences between Hardware and Software.

ii) Write a C program to find the mean and variance of 10 given real numbers. .

iii) Write a C program to check whether a number is prime or not.  $2+(2+3)+3$

c) i) Explain break and continue statements.

ii) Write a C program to display prime numbers between 1 and 200 using break and continue statements.  $4+6$

d) i) Write the differences between Compiler and Assembler.

ii) Design a Flowchart to find the G.C.D of two positive integers.

iii) Write a C program to find the sum of digits of a number.

$$3+3+4$$

### OPTION-B

#### MATH-H-SEC-T-1B

#### (Python Programming)

1. Answer any five questions:  $2 \times 5 = 10$
- a) What is a numeric literal in Python?
  - b) What is the difference between '=' and 'is' keyword in Python?
  - c) What is the difference between *break* and *continue*?
  - d) Convert  $(701574)_8$  into a base-4 number system.
  - e) How many bits are there in 1 terabyte?
  - f) Differentiate between list and tuple in Python.
  - g) What will be the value of the following Python expression:  $4+3\%2$ ? — Explain.
  - h) Define what it means for Python to be an interpreted language.
2. Answer any two questions:  $5 \times 2 = 10$
- a) List and explain four built-in string manipulation functions in Python with example.
  - b) Explain the dictionary data structure in Python with a suitable example.
  - c) Draw a flowchart to check whether a given number is prime or not.

- d) Describe the characteristics of each computer generation emphasizing technological advancements and key features.
3. Answer any two questions:  $10 \times 2 = 20$
- a) Write a program in Python that takes a sentence as input, removes vowels from the sentence, reverses the remaining characters, and prints the modified sentence.
- b) Write a program in Python to generate the first 'N' Fibonacci numbers.
- c) Explain positive and negative indexing in Python List access with suitable examples. Discuss List slicing with example.  $6+4$
- d) Explain the concept of dynamic typing in Python, covering its advantages, drawbacks, and comparisons with static typing. Write a Python program to illustrate dynamic typing.  $5+5$
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