

2024

MATHEMATICS — HONOURS

Paper : SEC-1

(C Language with Mathematical Applications)

Full Marks : 75

*The figures in the margin indicate full marks.**Candidates are required to give their answers in their own words as far as practicable.**Notations and Symbols have their usual meaning.*1. Answer **any five** questions :

3×5

(a) Write the output of the following C program :

```
#include<stdio.h>
main()
{
    int x = 7, y = 3, z;
    z = x%y + x/y;
    printf("z = %d", z);
}
```

(b) What will be the output of the following C program? Give reasons in support of your answer.

```
#include<stdio.h>
main()
{
    int n = 2025;
    printf("Result=%d", n/2);
}
```

(c) What will be the output of the following C program? Give reasons in support of your answer.

```
#include<stdio.h>
main()
{
    int m, n=6, p=6;
    m=n==p;
    printf("%d", m);
}
```

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(1355)

(d) Write the following expression in C :

$$\tan(1 + \sqrt{x}) + 3^{\cos x^3} + \log_{10} |1 + \sec^3 x|$$

(e) Explain the use of if-else statement in C with the help of an example.

(f) Compare and contrast RAM and ROM.

(g) State the conditions that a variable name in C must satisfy.

2. Answer **any five** questions :

- (a) (i) What are the main data types in C? Write short note on any one of them.
 (ii) Write a program in C to find the sum of odd numbers between 0 and 100. 3+5
- (b) (i) What is a loop in C? Explain its necessity with the help of an example.
 (ii) Write a program in C to sort 25 real numbers in ascending order. 3+5
- (c) (i) Describe the use of logical operators in C.
 (ii) Write a program to check whether a given number is divisible by both 3 and 5. 3+5
- (d) (i) Compare between for and while loops.
 (ii) Develop a C program to compute the product of two matrices of order 2×2. 3+5
- (e) (i) Find the errors in the following C program :
- ```
#include<stdio.h>
int main()
{
 int i;
 for (i = 0, i! = 4; i++)
 print("%f", -- i);
 return 0,
}
```
- (ii) Write a program in C to read three numbers x, y, z and rotate their values, such that x has the value of y, y has the value of z and z has the value of x. 3+5
- (f) (i) Write the different relational operators used in C language.  
 (ii) Write a C program to find the variance of a given set of numbers. 3+5
- (g) Explain the differences between “break” and “continue” statements in C. Write a program to illustrate the use of both. 3+5

3. Answer **any two** questions :

- (a) (i) Write a C program to find the approximate value of  $\pi$ .  
 (ii) Write a program in C that reads a positive integer, and checks whether it is an Armstrong number or not. 5+5
- (b) (i) Write a program in C that reads 20 names and sorts them in alphabetical order.  
 (ii) Write a C program to evaluate  $f(x)$  for  $x = 0, 2, \dots, 10$  using a function sub-program, where

$$f(x) = \begin{cases} x^2 + 2\sin x, & x < 2 \\ 2, & x = 2 \\ x^3 + e^x, & x > 2 \end{cases} \quad 5+5$$

- (c) (i) Write a program in C to compute the sum  $1 - \frac{2}{2!} + \frac{3}{3!} - \frac{4}{4!} + \frac{5}{5!} - \dots - \frac{50}{50!}$ .  
 (ii) Write a program in C that reads a positive integer and prepares its multiplication **table**. 5+5
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