Seat No. _____

HAK-003-2015002

B. Sc. (Sem. V) (CBCS) Examination

May – 2023

Mathematics : Paper-6(A)

(Programming in C & Numerical Analysis-1)

Faculty Code : 003
Subject Code : 2015002

Time : $2\frac{1}{2}$ Hours / Total Marks : **70**

Instructions : All questions are compulsory. Write answers in the answer-book.

1 (A) Answer the following questions : **4**

(1) How many keywords are there in language C ?

(2) In which year language C was invented ?

(3) Write full form of BCPL.

(4) Which language was invented by Ken Thompson ?

(B) Answer any **one** of the **two** questions : **2**

(1) Give the output of the following code :

```
int i, j, k;
i = 2; j = 7;
k = i/j;
printf("k = %d" k);
```

(2) Write output of following statement :

```
printf("\n I will become \n\t A good human being...\n
My mother \n\t blesses");
```

(C) Answer any **one** of the **two** questions : **3**

(1) Give an example of the goto statement in C.

(2) Explain the conditional operator statement in C language with example.

(D) Answer any **one** of the **two** questions : **5**

(1) Write a C program to calculate area of a circle when its radius is input through keyboard.

(2) Write a C program to calculate factorial.

2 (A) Answer the following questions : **4**

(1) Type format Specification for Long Integer variable is :

(a) %If (b) %Id (c) %Ld (d) %Lf

(2) What is the valid range of short type data ?

(3) Which statement can be used to terminate loop prematurely ?

(4) If the user defined function f is defined as :

```
int f(int x)
{
    int y;
    y=x/2;
    return(y);
}
```

then what is return value of f(2) ?

(B) Answer any **one** of the **two** questions : **2**

(1) Write two differences between for loop and do while loop.

(2) Write any program using for loop.

(C) Answer any **one** of the **two** questions : **3**

(1) Explain user defined function with suitable example.

(2) Write a C program to generate arithmetic progression up to 100 terms.

(D) Answer any **one** of the **two** questions : **5**

(1) Explain do-while loop with proper example.

(2) Write a C program using while loop.

3 (A) Answer the following questions : **4**

(1) Find error from the following statement of C program :

$$\#\ \text{defne}\ f(x) = x\hat{}2 + 2^{*}x + 1$$

(2) Which header file must be included to use fabs function in C program ?

(3) Which component of C processor converts object code and library function into executable code ?

(4) Preprocessor does not convert expanded source code (.I) into object file (.OBJ). (True/False)

(B) Attempt any **one** of the questions : **2**

(1) What is use of linker ?

(2) Explain macro with argument.

(C) Answer any **one** of the **two** questions : **3**

(1) Explain One dimensional array.

(2) Print backward difference table.

(D) Answer any **one** of the **two** questions : **5**

(1) Write C program to find transpose of a 4×5 matrix.

(2) Write C program to find sum of two 2×3 matrices.

4 (A) Answer the following questions : **4**

(1) In factorization Method Square Matrix A can be factorized into Form A = L.U Where L Is _____.

(2) In Crout's Method, every Square Matrix expressed as the product of _____.

(3) Write Normal Equation to best fit Straight Line.

(4) What is the Linear Law of the Curve $y = ax^{b}$?

(B) Answer any **one** of the **two** questions : **2**

(1) Write names of any two Direct Methods to solve simultaneous linear equations.

(2) Explain the Law to fit the Curve of the type $y = ax^{b}$.

(C) Answer any **one** of the **two** questions : **3**

(1) Explain Gauss-Seidel Method.

(2) Solve the following System of Equations by Gauss-Jordan Method.

$2x+10y+z=13; x+y+5z=7; 10x+y+z=12$.

(D) Answer any **one** of the **two** questions : **5**

(1) Explain Triangularization Method.

(2) Obtain Normal Equations to best fit a Straight Line.

5 (A) Answer the following questions : **4**

(1) Write Gregory Newton forward interpolation formula

(2) $x^{(0)}$ equals to _____.

(3) Define $x^{(-r)}$.

(4) Check $(1+\Delta)(1-\nabla)=1$

(B) Answer any **one** of the **two** questions : **2**

(1) In usual notation prove that $E=e^{hD}$.

(2) Check if $\Delta+\nabla=\frac{\Delta}{\nabla}-\frac{\nabla}{\Delta}$.

(C) Answer any **one** of the **two** questions : **3**

(1) Construct a central Difference Table from the following data :

x	0	1	2	3	4	5
y	1	8	27	64	125	216

(2) Evaluate $\Delta^2\left[\frac{1}{x(x+4)(x+8)}\right]$.

(D) Answer any **one** of **two** questions : **5**

(1) Explain Gregory Newton's Backward Interpolation Formula.

(2) One of the values of y is incorrect and y is a cubic polynomial. Find the error and correct it :

x	0	1	2	3	4	5	6	7
y	25	21	19	19	27	45	76	123