647510 **BSCc&nCC5020** **Seat No :_____**

B.Sc. Semester - 5 (*CBCS*) Examination

Oct/Nov. - 2022(Old Course)

PROGRAMMING IN C AND NUMERICAL ANALYSIS-1 (CORE)

Time: 2:30 Hours **Marks: 70**

Instructions:

1. All questions are compulsory.
2. Figures to the right indicate marks.

Que-1

(A) **ATTEMPT ANY ONE** **07**

(1) Write a short note on historical development of C.

(2) Explain : C- constants. Write syntax rules for constructing integer constants in C.

(B) **ATTEMPT ANY ONE** **04**

(1) Explain: Type Declaration Instructions in C.

(2) Explain: Type conversion in assignments in C.

(C) **ATTEMPT ANY ONE** **03**

(1) Write a short note on Logical Operators in C.

(2) Write a C-program to calculate compound interest.

Que-2

(A) **ATTEMPT ANY ONE** **07**

(1) Write a short note on Loop Control Structures in C .

(2) Write a C program to calculate factorial of $\boldsymbol{n}(\boldsymbol{n \leq 10})$.

(B) **ATTEMPT ANY ONE** **04**

(1) Write a short note on functions in C.

(2) Write a C program to determine the entered integer is a prime or not.

(C) **ATTEMPT ANY ONE** **03**

(1) Explain: break statement

(2) Write a C-program using atleast one User Defined Function.

Que-3

(A) **ATTEMPT ANY ONE** **07**

(1) Write a short note on pre-processor directives in C.

(2) Write a short note on arrays in C.

(B) **ATTEMPT ANY ONE** **04**

(1) Write a C program to add two matrices.

(2) Write a C program to calculate trace of a square matrix of order 5.

(C) **ATTEMPT ANY ONE** **03**

(1) Explain: Macros with argument.

(2) Write a C-program using macro with arguments.

Que-4

(A) **ATTEMPT ANY ONE** **07**

(1) Solve the following system of simultaneous linear equations by Gauss Elimination Method.

$$\boldsymbol{x + 2y + 3z = 6; 2x - y + z = 2; 5x + 7y - 10z = 2}$$

(2) Explain: Triangularization Method.

(B) **ATTEMPT ANY ONE** **04**

(1) What do you mean by the line of best fit ? Explain.

(2) Explain: Gauss-Seidels' Iterative Method for solving a simultaneous linear equations.

(C) **ATTEMPT ANY ONE** **03**

(1) Solve the following system of simultaneous linear equations by **Crout's Method**.

$$x + 5y + 3z = 9; 2x - 3y + z = 0; 5x + 7y + 9z = 21$$

(2) Solve the following system of simultaneous linear equations by **Gauss-Jacobi Method.**

$9x + 2y + 4z = 20$; $x + 10y + 4z = 6$; $2x - 4y + 10z = -15$.

Que-5

(A) **ATTEMPT ANY ONE** **07**

(1) Derive Gregory-Newtons' forward interpolation formula.

(2) Interpolate the missing values in the following table:

x	1	2	3	4	5
y	2	5	7	?	32

(B) **ATTEMPT ANY ONE** **04**

(1) In standard notations, show that

$$D = \frac{1}{h}\left[\nabla - \frac{\nabla^2}{2!} + \frac{\nabla^3}{3!} - \frac{\nabla^4}{4!} + \cdots\right]$$

(2) Explain: Interpolation and Extrapolation.

(C) **ATTEMPT ANY ONE** **03**

(1) Define: Forward Difference Operator Δ.

Show that $\Delta^n y_0 = y_n - \binom{n}{1} y_{n-1} + \binom{n}{2} y_{n-2} + \cdots + (-1)^n y_0$.

(2) In standard notations, deduce,

$y_{n-k} = y_n - \binom{k}{1} \nabla y_n + \binom{k}{2} \nabla^2 y_n - \ldots + (-1)^k \nabla^k y_n$. .

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