

B.Sc. Semester - 5 (Remedial) (CBCS) Examination
March/April-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.

Q.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.

Q.1(B) ATTEMPT ANY ONE (04)

1. Explain: Type Declaration Instructions in C.
2. Explain: Type conversion in assignments in C.

Q.1(C) ATTEMPT ANY ONE (03)

1. Write a short note on Logical Operators in C.
2. Write a C-program to determine the smallest number among three entered numbers through keyboard.

Q.2(A) ATTEMPT ANY ONE (07)

1. Explain: Loop Control Structures in C in details.
2. Write a C program to calculate factorial of n(n less than or equal to 10).

Q.2(B) ATTEMPT ANY ONE (04)

1. Write a short note on functions in C.
2. Write a C program to solve a quadratic equation.

Q.2(C) ATTEMPT ANY ONE (03)

1. Explain: break statement
2. Write a C-program using a User Defined Function.

Q.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.

Q.3(B) ATTEMPT ANY ONE (04)

1. Write a C program to add two matrices.
2. Write a C program to enter & print the marks of ten subjects of a student through keyboard and calculate & print percentage of marks.

Q.3(C) ATTEMPT ANY ONE (03)

1. Explain: Macros with argument.
2. Write a C-program using macros.

Q.4(A) **ATTEMPT ANY ONE** (07)

1. Solve the following system of simultaneous linear equations by Gauss Elimination Method. $x + 2y + 3z = 6; 2x - y + z = 2; 5x + 7y - 10z = 2$
2. Explain: Triangularization Method.

Q.4(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 system of simultaneous linear equations.

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

Q.5(A) **ATTEMPT ANY ONE** (07)

1. Derive Gregory-Newtons' backward interpolation formula.
2. Interpolate the missing values a & b in the following table of rice cultivation in India.

Year (x)	1911	1912	1913	1914	1915	1916	1917	1918	1919
Acres(y)	76.6	78.2	a	77.7	78.7	b	80.6	77.6	78.6

Q.5(B) **ATTEMPT ANY ONE** (04)

1. In standard notations, show that
$$D = \frac{1}{h} \left\{ \Delta - \frac{\Delta^2}{2!} + \frac{\Delta^3}{3!} - \frac{\Delta^4}{4!} + \dots \right\}.$$
2. Explain: Interpolation and Extrapolation.

Q.5 (C) **ATTEMPT ANY ONE** (03)

1. Define: Forward Difference Operator Δ .
Show that $\Delta^n y_0 = y_n - \binom{n}{1} y_{n-1} + \binom{n}{2} y_{n-2} + \dots + (-1)^n y_0.$
2. In standard notations, deduce,
$$y_n = \binom{n}{0} y_0 + \binom{n}{1} \Delta y_0 + \binom{n}{2} \Delta^2 y_0 + \dots + \binom{n}{n} \Delta^n y_0 .$$
