

B.Sc. Semester - 5 (CBCS) Examination**Oct/Nov. - 2021(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) Answer any one of the following questions.**[07]**

- (1) Write a short note on origin and history of C.
- (2) Write syntax rule for constructing real constants in fractional form with example.

Q.1 (B) Answer any one of the following questions.**[04]**

- (1) Give complete list of Key words in C language.
- (2) Explain type declaration instruction in C language.

Q.1 (C) Answer any one of the following questions.**[03]**

- (1) Write a C program to calculate area of a rectangle when length and width of the same are given.
- (2) Explain Hierarchy of operations in C language.

Q. 2 (A) Answer any one of the following questions.**[07]**

- (1) Explain if – else statement in C language with example.
- (2) Explain the meaning of break statement with example.

Q.2 (B) Answer any one of the following questions.**[04]**

- (1) Explain primary data type in C – language.
- (2) What is a return type?

Q.2 (C) Answer any one of the following questions.**[03]**

- (1) Explain difference between while loop and do while loop.
- (2) What is a calling function?

Q.3 (A) Answer any one of the following questions.**[07]**

- (1) Write a note on processor derivatives.
- (2) Write a program to add two 3 X 3 matrices.

Q.3 (B) Answer any one of the following questions.**[04]**

- (1) Explain the syntax of one dimensional array with example.
- (2) Write a C program to find prime numbers between two numbers.

Q.3 (C) Answer any one of the following questions.**[03]**

- (1) Explain Macro substitution derivatives used in C language.
- (2) List out types of array.

Q.4 (A) Answer any one of the following questions.**[07]**

- (1) Solve the following system of linear equations using Crout's method.

$$2x - 6y + 8z = 24; 5x + 4y - 3z = 2; 3x + y + 2z = 16.$$

- (2) Solve the following system of linear equations using Gauss elimination method.

$$2x + y + z = 4; x + 2y + z = 4; x + y + 2z = 4.$$

Q.4 (B) Answer any one of the following questions.**[04]**

- (1) Derive normal equations to best fit a straight line.
- (2) Find a curve of the form $y = a x^b$ which is best fit to the following data.

X	1	2	3	4	5
Y	0.5	2	4.5	8	12.5

Q.4 (C) Answer any one of the following questions.**[03]**

- (1) Explain Gauss-seidel method to solve a system of linear equations.
- (2) Explain principle of least square.

Q.5 (A) Answer any one of the following questions.**[07]**

- (1) Construct forward difference table from the following data and evaluate $\Delta^3 y_1$ and y_x .

x	0	1	2	3	4
y	1	1.5	2.2	3.1	4.6

- (2) Derive Gregory Newton backward interpolation formula.

Q.5 (B) Answer any one of the following questions.**[04]**

- (1) Find missing term in the following table.

x	1	2	3	4	5
Y	2	5	7	-	32

- (2) Express the polynomial $p(x) = x^4 + 6x^2 - 7x + 6$ in factorial notation if the interval of differencing is one.

Q.5 (C) Answer any one of the following questions.**[03]**

- (1) Find the value of $(-2 + 4x)^{[3]}$ for $x = -1$.
- (2) In usual notations prove that $\mu^{-1} = 1 - \frac{1}{8} \delta^2 + \frac{3}{128} \delta^4 - \frac{5}{1024} \delta^6 + \dots$
