

B.Sc. Semester - 5 (CBCS) Examination

December -2020 (NEW COURSE)

Programming in C and Numerical Analysis -1(Core)

Time: 1:30 Hours

Marks: 42

Instructions:

1. Figures to the right indicate marks.
2. There are five questions in the question paper.
3. Answer any three of the following questions.

Q.1 (A) Answer any two of the following questions.**[10]**

- (1) Write a short note on history of C.
- (2) Write syntax rules for constructing integer constant with example.
- (3) Explain `printf()` function.

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

- (1) Write a C program to find sum of digits of a given number.
- (2) Write a short note on C characters.

Q.2 (A) Answer any two of the following questions.**[10]**

- (1) Write and explain usage of nested if – else statement in C language.
- (2) Explain the conditional operator statement in C with example.
- (3) Write a C program to determine whether the number entered is even or odd.

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

- (1) Explain continue statement with its syntax.
- (2) Explain syntax and usage of while loop.

Q.3 (A) Answer any two of the following questions.**[10]**

- (1) Write a C program using one dimensional array and explain it.
- (2) Write a detailed note on primary data types in C.
- (3) Write a C program to enter a 3 X 3 matrix.

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

- (1) Explain types of C preprocessor directives in brief.
- (2) Explain macro substitution derivatives in C language.

Q.4 (A) Answer any two of the following questions.**[10]**

- (1) Explain Gauss elimination method to solve a system of linear equations.
- (2) Find curve of the type $y = ae^{bx}$ best fit to the following data.

x	0	0.5	1.0	1.5	2.0	2.5
y	0.10	0.45	2.15	9.15	40.35	180.75

- (3) Solve the following system of equations by Gauss -seidel Method.

$$9x + 2y + 4z = 20, \quad x + 10y + 4z = 6, \quad 2x - 4y + 10z = -15.$$

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

- (1) Explain Jacobi's iteration method to solve a system of linear equations.
- (2) Obtain normal equations to best fit the curve $y = ax^b$.

Q.5 (A) Answer any two of the following questions.**[10]**

- (1) Derive Gregory Newton backward interpolation formula.
- (2) Construct a forward difference table from the following data and evaluate $\Delta^3 y_1$.

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

- (3) In the following table, one value of y is incorrect and that y is a cubic polynomial in x. Find the correct value of that y.

x	0	1	2	3	4	5	6	7
y=f(x)	25	21	18	18	27	45	76	123

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

- (1) Express the polynomial $p(x) = x^4 - 12x^3 + 42x^2 - 30x + 9$ in factorial notation if the interval of differencing is one.
- (2) With usual notations prove the following.

$$(a) \nabla^2 y_8 = y_8 - 2y_7 + y_6 \quad (b) \mu^2 = 1 + \frac{\delta^2}{4}.$$