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RO-003-001514

Seat No. _____

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

February - 2019

Mathematics : Paper - BSMT - 502(A)

(Programming in C & Numerical Analysis) (Theory)

Faculty Code : 003

Subject Code : 001514

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

1 Answer the following : **20**

(1) C language has been developed by _____.

(2) 1 byte = _____ Bits.

(3) Which escape character can be used to begin a New line in C ?

(4) Write the range off float data type.

(5) Which statement is used to read the data in C language ?

(6) What is array ?

(7) Which header file required to use printf( ) and scanf( ) function ?

(8) C programs are converted into machine language with the help of _____.

(9) Which is the only function all C programs must contain ?

(10) Write the range of char data type.

(11) The $(n+1)^{th}$ forward difference of a polynomial of degree n is _____.

(12) In a Crout's method, every square matrix A can be factorized into form A=LU where L is _____.

(13) Relation between E and δ is _____.

(14) If interval of differences is 2, then $E^n f(x) =$ _____.

(15) $\Delta^2 y_5 =$ _____.

(16) The algebraic sum of the errors in any differences column is _____.

(17) $\Delta^3 \left(x^2 + 2x + 1\right) =$ _____.

(18) If interval of differencing is h, then $\Delta^n e^x =$ _____.

(19) Define shift operator.

(20) Write Gregory-Newton forward interpolation formula.

2 (a) Answer any **three** out of six : **6**

(1) Explain Type-Declaration in C language.

(2) Explain printf( ) in C language.

(3) Explain Relational Operator.

(4) Explain Function in C language.

(5) Explain float and doubles in C language.

(6) Define User defined function.

(b) Answer any **three** out of six : **9**

(1) Explain do while loop.

(2) Explain break statement.

(3) Explain sign and unsigned character in C language.

(4) Explain go to statement.

(5) Write a programme to find out year is leap or not using conditional operator.

(6) Explain Macro with arguments.

(c) Answer any **two** out of five : **10**

(1) Explain one dimensional array with example.

(2) Explain if statement with example.

(3) Explain Continue statement with example.

(4) Write a programme to evaluate factorial of given number.

(5) Write a programme to find out average of 10-numbers using for( ).

3 (a) Answer any **three** : **6**

(1) In usual notation prove that $\delta^2 = \Delta - \nabla$.

(2) In usual notation prove that $\Delta^3 y_2 = \nabla^3 y_5$.

(3) Show that $\Delta^3\left[(1-x)(1-2x)(1-3x)\right] = -36$, if h=1.

(4) Write Normal equations to best fit the curve $y = ax + b$.

(5) What is the linear law of the curve $xy = ax + by$.

(6) Write name of four direct methods for solving linear equations.

(b) Answer any **three** : **9**

(1) Find a cubic polynomial which takes the following set of values (0, 1), (1, 2), (2, 1) and (3, 10).

(2) Solve the system of equations :

$$\begin{aligned} 10x + y + z &= 12 \\ 2x + 10y + z &= 13 \\ 2x + 2y + 10z &= 14 \end{aligned}$$

using Gauss elimination method.

(3) Show that $y_3 = y_2 + \Delta y_1 + \Delta^2 y_0 + \Delta^3 y_0$.

(4) In usual notation prove that

$$D = \frac{1}{h}\left[\Delta - \frac{\Delta^2}{2} + \frac{\Delta^3}{3} - \frac{\Delta^4}{4} + \ldots\ldots\ldots\right]$$

(5) Fit a straight line $y = ax + b$ to following set of observation.

X	1	2	3	4	5
Y	14	27	40	55	68

(6) Express $f(x) = x^4 - 12x^3 + 42x^2 - 30x + 9$ as factorial polynomial with difference of interval is one(1).

(c) Answer any **two** : **10**

(1) Derive Gregory Newton's backward interpolation formula.

(2) Explain method of Factorization.

(3) Explain Least square principles and using it find Normal equation of the curve $y = ax^b$.

(4) Prove that n^{th} difference of polynomial of degree n is constant.

(5) Explain Gauss Jacobi Method of iteration.
