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BCA (Part-II) Examination, 2022

THEORETICAL FOUNDATION OF COMPUTER SCIENCE

(Numerical Analysis)

[Paper : First]

Time Allowed : Three Hours

Maximum Marks : 50

Minimum Pass Marks : 20

Note : Attempt **all five** questions. **One** question from each **unit** is **compulsory**. All questions carry **equal** marks.

Unit-I

1. Find the roots of the equation $x^3 - x - 4 = 0$ using the bisection method.

Or

Find a real root of the equation $x^3 - 2x - 5 = 0$ using Regula-Falsi method.

Unit-II

2. Solve the following system by Gauss elimination method

$$6x_1 + 3x_2 + 2x_3 = 6,$$

$$6x_1 + 4x_2 + 3x_3 = 0 \text{ and}$$

$$20x_1 + 15x_2 + 12x_3 = 0$$

Or

Solve the system of linear equations $x + 2y + 3z = 5$, $2x + 8y + 22z = 6$, $3x + 22y + 82z = -10$ using the Cholesky method.

Unit-III

3. Estimate the sale for 1966 using the following table :

Year	1931	1941	1951	1961	1971	1981
Sale in thousand	12	15	20	27	39	52

Or

Given $\log_{10} 300 = 2.4771$, $\log_{10} 304 = 2.4829$, $\log_{10} 305 = 2.4843$ and $\log_{10} 307 = 2.4871$. find $\log_{10} 301$

Unit-IV

4. Find $f'(10)$ from the following data :

x:	3	5	11	27	34
$f(x)$:	-13	23	899	17315	35606

Or

Use Simpson's $1/3$ rd rule to find $\int_0^{0.6} e^{-x^2} dx$ by taking seven ordinates.

Unit-V

5. Use Picard's method the apporoximate y when $x = 0.1$, $x = 0.2$ given that $y = 0, x = 0$, $\frac{dy}{dx} = x + y$.

Or

Use Runge-Kutta Method to solve $y' = xy$ for $x = 1.4$ initially $x = 1$, $y = 2$ (take $h = 0.2$)

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