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ED-2763(S)

B.A./B.Sc./B.Sc. B.Ed. (Part-III)
Suppl. EXAMINATION, 2021
MATHEMATICS (Optional)
Paper Third (D)
(Programming in C and Numerical Analysis)

Time : Three hours   Maximum Marks : 30

Note : *Attempt any two parts from each Unit. Each part carries equal marks.*

Unit-1

1. (a) Draw a flow chart for creating a program.

   (b) Explain logical and conditional operators.

   (c) Draw a multiplication table having 5 rows and 6 columns.

Unit-2

2. (a) Using bisection method find the smallest root of the following equation up to three places of decimals :
   $$f(x) = x^3 - 5x + 1 = 0$$

[P.T.O.]

   (b) Prove that :
   $$\Delta^n u_{x-n} = u_x - nu_{x-1} + \frac{n(n-1)}{2}u_{x-2}$$
   $$\ldots\ldots (-1)^n u_{x-n}$$

   (c) From the following table, find the value of $\frac{dy}{dx}$ at $x = 1.2$.

x	y
1.0	2.7183
1.2	3.3201
1.4	4.0552
1.6	4.9530
1.8	6.0496
2.0	7.3891
2.2	9.0250

Unit-3

3. (a) Solve the following equations by Jocobi's iteration method :
   $$20x + y - 2z = 17$$
   $$3x + 20y - z = -18$$
   $$2x - 3y + 20z = 25$$

(b) Solve the following equations by Relaxation method :

$$10x + 2y + 3z = 205$$
$$2x + 10y + 2z = 154$$
$$2x + y + 10z = 120$$

(c) By using Jacobi's method, find the eigen values of the following :

$$A = \begin{matrix} 2 & 1 & 0 \\ 1 & 4 & 1 \\ 0 & 1 & 4 \end{matrix}$$

Unit-4

4. (a) Using Euler's method find the approximate value of y corresponding to $x = 1$, given that

$$\frac{dy}{dx} = x + y, y = 1 \text{ where } x = 0$$

(b) Use Range's method to approximate y when $x = 1.1$. Given that $y = 1.2$ at $x = 1$

where $\frac{dy}{dx} = 3x + y^2$

(c) Find the Eigen values of the following :

$$A = \begin{matrix} 1 & 2 & 3 \\ 0 & 4 & 2 \\ 0 & 0 & 7 \end{matrix}$$

Unit-5

5. (a) Explain the integration process through Monte Carlo.

(b) Approximate the integral

$$\int_0^1 x \, dx$$

by Monte Carlo method.

(c) Explain acceptance rejection method through Monte Carlo method.