Roll No. .....

ED–2763

B. A./B. Sc./B. Sc. B. Ed. (Part III)
EXAMINATION, 2021

MATHEMATICS

(Optional)

Paper Third (D)

(Programming in C and Numerical Analysis)

Time : Three Hours

Maximum Marks : 30

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

Unit—I

1. (a) Write any 12 preprocessors.

   (b) Write a program for books using structure.

   (c) Explain file formatting and write a program for file formatting.

Unit—II

2. (a) By using Newton-method find a root of the following equation :

$$x^3 - 2x - 5 = 0$$

upto three places of decimals.

(b) By using following table find the value of $\log_{10} 301$ by Lagrange's interpolation formula :

x	$\log_{10} x$
300	2.4771
304	2.4829
305	2.4843
307	2.4871

(c) Find the first and second derivatives of the function tabulated given as follows at the point $x = 3.0$:

x	$f\ x$
3.0	– 14.000
3.2	– 10.032
3.4	– 5.296
3.6	0.256
3.8	6.672
4.0	14.000

Unit—III

3. (a) Solve the following equations by Relaxation method :

$$9x - 2y + z = 50$$
$$x + 5y - 3z = 18$$
$$-2x + 2y + 72 = 19$$

(b) Solve the following equation by Gauss's Elimination method :

$$5x - y - 2z = 142$$
$$x - 3y - z = -30$$
$$2x - y - 3z = -5$$

(c) Explain Given's method.

Unit—IV

4. (a) Given that $\frac{dy}{dx} = \frac{y - x}{y + x}$ with the initial conditional $y = 1$ at $x = 0$. Find the value of y for $y = 0.1$ by Euler's method.

(b) By using Runge's method to approximate y at $x = 1.6$ when $y = 0.4$ at $x = 1$.

$$\text{where } \frac{dy}{dx} = x - y$$

(c) Solve the following equation :

$$y'' + y + 1 = 0$$

where boundary condition are as follows :

$y = 0$ when $x = 0$ and $y = 0$ when $x = 1$.

Unit—V

5. (a) Explain random numbers through Monte Carlo method.

(b) Explain normal variates through Monte Carlo method.

(c) Explain improper integrals with the reference of Monte Carlo integration.