Roll No. ..........................

Y – 3178

**M.A./M.Sc. (Second Semester)**
**EXAMINATION, May/June 2021**
**MATHEMATICS**
**Paper – 204**
**(Numerical Methods)**
*Time : Three Hours*

*Maximum Marks : 85*                                    *Minimum Pass Marks : 29*

**Note :** Attempt *all* questions.

## Unit-I

1. Define the rate of convergence and find the rate of convergence for the secant method.                                                              17

## Unit-II

2. Solve the system of equations :                                        17

$$2x_1 - x_2 + 0x_3 = 7$$
$$-x_1 + 2x_2 - x_3 = 1$$
$$0x_1 - x_2 - 2x_3 = 1$$

using the Gauss-Seidal method, take the initial app as $x^{(0)} = 0$ and perform three iterations.

## Unit-III

3. Produce the hermite interpolation polynomial for the following data :    17

| $x$ | $f(x)$ | $f'(x)$ |
|-----|--------|---------|
| −1 | 1 | −5 |
| 0 | 1 | 1 |
| 1 | 3 | 7 |

## Unit-IV

4. Establish the Newton-Cote's formula for numerical integration.          17

## Unit-V

5. Solve IVP :                                                            17

$$\frac{du}{dt} = -2tu^2, \; u(0) = 1$$

With h = 0.2 on the interval [0, 1]. Use the fourth order classical Runge-Kutta method.

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