Roll No. ....

Y – 3638

B.C.A. (Fourth Semester) EXAMINATION, May/June-2021

Paper – 401

NUMERICAL METHODS

Time : Three Hours

Maximum Marks : 80   *Minimum Pass Marks : 32*

Note—Attempt *all* questions.

Unit-I

1. (a) Find a real root of the equation $f(x) = x^3 - 2x - 5 = 0$ using bisection method in five stages.　8

   (b) Find a root of the equation $x - e^{-x} = 0$ correct to three decimal places by the secant method.　8

Unit-II

2. (a) Solve the following system by Gauss elimination method—　8
   $$6x_1 + 3x_2 + 2x_3 = 6$$
   $$6x_1 + 4x_2 + 3x_3 = 0$$
   $$20x_1 + 15x_2 + 12x_3 = 0$$

   (b) Solve by Jacobi's iteration method　8
   $$27x + 6y - z = 85$$
   $$6x + 15y + 2z = 72$$
   $$x + y + 54z = 110$$

Unit-III

3. (a) Estimate the sale for 1966 using the following table—　8

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

   (b) Given that :　8

x :	5	7	11	13	17
$f(x)$:	150	392	1452	2366	5202

   Evaluate $f(9)$, using Newton's divided difference formula.

P.T.O.

Unit-IV

4. (a) Show that $\int_0^1 \dfrac{dx}{1+x} = \log_e 2 = 0.69315$ 8

    (b) Evaluate the integral   8

$$I = \int_0^1 \frac{dx}{1+x}$$

Unit-V

5. (a) Use Picard's method to approximate y when $x = 0.2$ given that $y = 1$ when $x = 0$, and $\dfrac{dy}{dx} = x - y$ 8

    (b) Use Euler's method to find $y(0.4)$ from the differential equation $\dfrac{dy}{dx} = xy,\ y(0) = 1.$ Take for each step $h = 0.1$ 8