Roll No. .....

Y– 3638 (A)

B.C. A. (Fourth Semester) (SPECIAL) EXAMINATION, August 2021

[SECOND CHANCE]

PAPER—I

NUMERICAL METHODS

Time : Three Hours

Maximum Marks : 80 (*For Regular Students*) *Minimum Pass Marks :* 32

Note—Attempt *all* questions.

1. (a) Use-Newton's method to find a root of the equation $x^3-3x-5=0$. 8

   (b) Find the root of the equation $xe^x=\cos x$ using the regula-falsi method correct to four decimal places. 8

2. (a) Solve by Gauss-elimination method : 8

   $2x+y+4z=12$
   $8x-3y+2z=23$
   $4x+11y-z=33$

   (b) Solve the equation : 8

   $x+4x-z=-5$
   $x+y-6z=-12$
   $3x-y-z=4$

   Using Gauss-Jordan method.

3. (a) Given
   sin 45° = 0.7071, sin 50° = 0.7660
   sin 55° = 0.8192, sin 60° = 0.8660
   Find sin 52° by using Newton's forward difference interpolation formula. 8

   (b) Find the third divided difference with arguments 2, 4, 9, 10 of the function $f(x)=x^3-2x$. 8

P.T.O.

4. (a) Find a unique polynomial of degree 2 or less such that $f(0) = 1$, $f(1) = 3, f(3) = 55$ using Newton's divided difference interpolation formula. 8

(b) Calculate $\int_0^1 \frac{dx}{1+x^2}$ taking $h = 0.125$ with the help of trapezoidal rule. 8

5. (a) Using Euler's method solve the differential equation in six steps $\frac{dy}{dx} = x + y$, $y(0) = 0$, choosing $h = 0.2$. 8

(b) Using Runge-Kutta method of fourth order to solve

$\frac{dy}{dx} = xy$ for $x = 1.2$, initially $x = 1, y = 2$ (take $h = 0.1$) 8