



D-003-004104

Seat No. _____

B. Sc. (Sem. I) (I.T.) Examination

March – 2022

Mathematics

[Foundation of Mathematics & Statistics] (Old Course)

Faculty Code : 003

Subject Code : 004104

Time : $2\frac{1}{2}$ Hours]

[Total Marks : 70

- Instructions :** (1) Each question carries equal marks.
(2) Attempt any five questions.

1 (a) Explain :

Row matrix, unit matrix.

(b) Find the adjoint of the matrix $A = \begin{bmatrix} 1 & 1 & 1 \\ 1 & -1 & 1 \\ 2 & 1 & -1 \end{bmatrix}$.

2 (a) Explain : Gauss-Jordan method.

(b) Apply Gauss-Elimination method to solve the equation.

$$2x + 3y - 2z = 3, \quad x + 2y - z = 2, \quad x + 3y - 2z = 2$$

3 (a) Explain : Newton's forward difference formula for interpolation.

(b) If $\sqrt{2} = 1.41$, $\sqrt{5} = 2.24$, $\sqrt{6} = 2.45$. Find $\sqrt{8}$, Using Lagrange's method.

- 4 (a) Explain : bisection method.
- (b) Find a root of the equation $x^3 - 3x - 1 = 0$. Using the N-R method.
- 5 (a) Explain : Simpson's $\frac{1}{3}$ rule.
- (b) Evaluate $\int_0^1 \frac{1}{1+x} dx$ by trapezoidal rule with $h = 0.125$.
- 6 (a) $\frac{dy}{dx} = \frac{x+y}{2}$ with $y(0) = 1$, $h = 0.2$, find $y(0.4)$ using Euler's modify method.
- (b) Using R-K 4th order method. Find $y(0.3)$ given that $\frac{dy}{dx} = x^2 - y$, $y(0) = 1.2$, $h = 0.1$.
- 7 (a) Explain : Simple bar diagram, pie diagram.
- (b) Explain : Uses of LPP.
- 8 (a) Explain : North-west corner method.
- (b) From the following TP, find initial solution using Vogel's method.

		<i>Demand</i>				
		<i>X</i>	<i>Y</i>	<i>X</i>	<i>W</i>	<i>Supply</i>
<i>Supply</i>	<i>A</i>	19	30	50	10	7
	<i>B</i>	70	30	40	60	9
	<i>C</i>	40	8	70	20	18
<i>Demand</i>		5	8	7	14	

9 (a) Explain : Rank correlation method.

(b) Obtain two regression lines.

$$\bar{x} = 39.5, \bar{y} = 47.5, s_x = 10.8, s_y = 16.8, r = 0.42$$

10 (a) Fit a straight line $y = a + bx$ to the following data.

Year	2011	2012	2013	2014	2015	2016	2017
Profit	80	90	92	83	94	99	92

(b) Fit a second degree parabola to the following data.

x	1	2	3	4	5
y	1090	1220	1390	1625	1915
