

GYANMANJARI INNOVATIVE UNIVERSITY

GYANMANJARI INSTITUTE OF TECHNOLOGY

B.Tech.-Mid Semester Examination (MSE)-W2025

Enrollment No. ~~XXXXXXXXXX~~

Subject Code: BETXX10209

Subject Name: Mathematics-II

Time: 2:30 pm to 4:30 pm

Date: 13/09/2025

Semester: 3

Total Marks: 60

Instructions:

1. Question No. 1 is compulsory.
2. Make suitable assumptions wherever necessary.
3. Figures to the right indicate full marks.

Q.1 (a) Find the missing frequency when the median is 24.

Marks

Wages	0 – 10	10 – 20	20 – 30	30 – 40	40 – 50
Workers	15	20	x	14	16

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- (b) The probability that a regularly scheduled flight departs on time is 0.83; the probability that it arrives on time is 0.82; and the probability that it departs and arrives on time is 0.78. Find the probability that a plane (i) arrives on time given that it departed on time, and (ii) departed on time given that it has arrived on time.

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- (c) Find the mean, median and mode of the following data:

Class	30-40	40-50	50-60	60-70	70-80	80-90	90-100
Frequency	12	17	28	23	7	8	5

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Q.2 (a) Find the solution of the following system of equations:

$$3x - y + z = 1; 3x + 6y + 2z = 0; 3x + 3y + 7z = 4$$

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- (b) Obtain the root of $x^3 - x - 1 = 0$ using False position method correct up to 2 decimal places

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OR

- (b) Find $\sqrt[3]{48}$ using Newton Raphson method correct to three decimal places.

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- (c) Find an approximate value of the root of the equation $x^3 + x + 1 = 0$ using the method of Regula Falsi Method.

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OR

- (c) Solve the given system of equations using Gauss Seidel method:

$$20x + y - 2z = 17$$

$$3x + 20y - z = -18$$

$$2x - 3y + 20z = 25$$

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- Q.3 (a) Evaluate: $\int_0^3 \frac{1}{1+x} dx$, with $h = 0.5$ by

1) Simpson's 1/3 rule

2) Simpson's 3/8 rule

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- (b) Apply Lagrange's method to find the value of x when $f(x) = 15$ from the given data:

x	5	6	9	11
$f(x)$	12	13	14	16

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- (c) Find by Taylor series method the value of y at $x = 0.1$ and 0.2 to four decimal places of

$$\frac{dy}{dx} = x^2y - 1, y(0) = 1.$$

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OR

- Q.3 (a) Solve $\frac{dy}{dx} = f(x, y) = 1 - y, y(0) = 0$ for $x = 0.3$

using Euler's method by taking $h = 0.1$.

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- (b) Apply Range-Kutta Method fourth order to find an approximate value of y when $x = 0.2$ given that

$$\frac{dy}{dx} = x + y \text{ and } y = 1 \text{ when } x = 0.$$

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- (c) Using Newton's interpolation formula, estimate the population of 1895 and 1925.

year	1891	1901	1911	1921	1931
population	46	66	81	93	101

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