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GANDHI INSTITUTE OF ENGINEERING AND TECHNOLOGY UNIVERSITY, ODISHA, GUNUPUR
(GIET UNIVERSITY)

B. Tech (First Semester - Regular) Examinations, December – 2024

23BBSBS110B1 - Engineering Mathematics- I

(Only for Biotech)

Time: 3 hrs | Maximum: 60 Marks

Answer ALL questions

(The figures in the right hand margin indicate marks)

PART – A **(2 x 5 = 10 Marks)**

Q.1. Answer ***ALL*** questions	CO #	Blooms Level
a. Use a direct proof to show that the sum of two even integers is even	CO1	K1
b. Let A = {1, 2, 3, 4}. Find the relation R is a. Reflexive with Symmetric b. Reflexive with Transitive	CO2	K2
c. Define the Diagonally Dominance of linear equation	CO2	K1
d. Find the Relative error and Percentage error of the point $x_T = 2.3456789,\ X_A = 2.33$	CO1	K1
e. Find the mean, median, and mode of the given data are 8, 11, 4, 3, 2, 5, 10, 6, 4, 1, 10, 8, 12, 6, 5, 7.	CO3	K1

PART – B **(10 x 5 = 50 Marks)**

Answer ***ALL*** the questions	Marks	CO #	Blooms Level
2. a. Show that $(p \to q) \vee (p \to r)$ and $p \to (q \vee r)$ are logically equivalent	5	CO2	K2
b. Prove that $1^3 + 2^3 + 3^3 \cdot\cdot + n^3 = \left[\frac{n(n+1)}{2}\right]^2$ for the positive integer n by Using mathematical induction.	5	CO2	K3
(OR)			
c. Construct the truth table of $(p \vee q) \wedge (p \to r) \wedge (q \to r)$.	5	CO2	K2
d. Show that $\sqrt{2}$ is a irrational number by method of contradiction	5	CO2	K3
3.a. Find the inverse of the matrix $A = \begin{pmatrix} 2 & 3 & 4 \\ 4 & 3 & 1 \\ 1 & 2 & 4 \end{pmatrix}$	5	CO2	K2
b. Solve the system of linear equation by Cramer's Rule 3x + 2y + 4z = 18, x -2y + 5z = 15, 2x + 6y +7z = 11	5	CO3	K3
(OR)			
c. Find the rank of the matrix $\begin{bmatrix} 3 & -1 & 3 \\ 2 & -4 & 6 \\ 10 & 0 & 14 \end{bmatrix}$	5	CO3	K2
d. Solve the system of linear equation by Cramer's Rule 5x - 3y + z = 6, 2x +3 y - z = 8, 8x + 9y -3z = 28	5	CO4	K3
4.a. Find root of equation cos x – 3x +1 = 0 by using Newtown- Raphson method up to three decimal	5	CO4	K2
b. Solve the system of Linear equations, by Gauss elimination method	5	CO4	K3

$x + 5y - z = 10,\quad x + y + 8z = 20,\quad 4x + 2y + z = 14$

(OR)

c. Find root of equation $x^3 - 3x + 1 = 0$ by using Iteration method up to three decimal. 5 CO3 K2

d. Solve the Linear equations, by Gauss – Seidel method up to two decimal 5 CO4 K3

$$10x + 2y + z = 9$$
$$x + 10y - z = -22$$
$$-2x + 3y + 10z = 22$$

5.a. Find the *value f(9)* given data by using Newton forward interpolation formula 5 CO5 K2

x	8	10	12	14	16	18
f(x)	10	19	32.5	54	89.5	15.4

b. Obtain the Newton's divided difference interpolating polynomial and find *f(3)* 5 CO5 K3

x	0	1	2	5
f(x)	2	3	12	147

(OR)

c. Find the interpolation polynomial of given data and find y(3.5) and y(5.5). 5 CO5 K3

x	3	4	5	6
Y = f(x)	6	24	60	120

d. Find the value of y(4) by Using Lagrange's interpolation formula of the following data 5 CO5 K3

x	-1	0	2	3	5
Y = f(x)	-8	3	1	2	43

6.a. Out of 100 numbers, 20 were 4's, 40 were 5's, 30 were 6's and the remainder were 7's. Find the arithmetic mean of the numbers and its standard deviation. 5 CO4 K2

b. Find a least squares straight line of Y on X for the given data: Predict Y at X = 5 5 CO4 K3

X	2	4	6	8	10	12
Y	1.8	1.5	1.4	1.1	1.1	0.9

(OR)

c. Four groups of students, consisting of 15, 20, 10, and 18 individuals, reported mean weights of 162, 148, 153, and 140 pounds (lb), respectively. Find the mean weight of all the students and its variance. 5 CO5 K2

d. Determine the correlation coefficient for the correct . 5 CO4 K3

X	1	2	3	4	5	6
Y	6	4	3	5	4	2

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