QP Code:RD23BTECH003 | Reg. No | | | | | | | | | | | AY 23

GIET UNIVERSITY, GUNUPUR – 765022

B. Tech (First Semester) Regular Examinations, December – 2023

23BBSBS110B1 - Engineering Mathematics-I

(Biotechnology)

Time: 3 hrs | Maximum: 60 Marks

(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. Construct the Truth table (P∨Q)→(P∧Q).	CO1	K1
b. If S=$\{a,b,c\}$ T={1,2},then Find Power set P(S) and P(T).	CO1	K1
c. Show that the Matrix is Orthogonal matrix $A=\begin{bmatrix} cos\theta & -sin\theta \\ sin\theta & cos\theta \end{bmatrix}$.	CO2	K2
d. If $\pi=\frac{22}{7}$ *is* approximated as 3.14 than find Absolute error, Relative error and relative percentage error.	CO1	K1
e. Write down the formula to find coefficient of correlation.	CO2	K1

PART – B **(10 x 5 = 50 Marks)**

Answer ***ALL*** questions	Marks	CO #	Blooms Level
2. a. If A = {0,2,4,6,8} $B=\{0,1,2,3,4\}$ $C=\{0,3,6,9\}$ $Find\ A\cup B\cup C$, $A\cap B\cap C$, $(A\cup B)\cap C$, $(A\cap B)\cup C$, $(A-B)\cup(B-A)$, $(A\cup B)-(A\cap B)$	5	CO2	K3
b. Prove by Truth table p ∧$(q\vee r)\equiv(p\wedge q)\vee(p\wedge r)$.	5	CO2	K2
(OR)			
c. Prove by method of induction 1+2+3+…+n = $\frac{n(n+1)}{2}$.0	5	CO4	K3
d. Show that p∨$(q\wedge r)and$ (p∨q)∧(p∨r) are logically equivalent.	5	CO3	K2
3.a. Let A = $\begin{bmatrix} 1 & -2 & 5 \\ 4 & 4 & 8 \\ -3 & 1 & 0 \end{bmatrix}$ and B = $\begin{bmatrix} 5 & 2 & 0 \\ -5 & 3 & -4 \\ -4 & 2 & -4 \end{bmatrix}$. Then find A+B, A-B, 2A+3B, 2B+3A , A-2B , AB.	5	CO3	K2
b. Find the Rank of the matrix A = $\begin{bmatrix} 4 & 2 & 3 \\ 8 & 4 & 6 \\ -2 & -1 & 1.5 \end{bmatrix}$.	5	CO4	K3
(OR)			
c. Express as Sum of a symmetric and Skew symmetric matrix where A = $\begin{bmatrix} 4 & 2 & -3 \\ 1 & 3 & -6 \\ -5 & 0 & -7 \end{bmatrix}$.	5	CO3	K3
d. Solve by Cramer's rule $x+y+z=6$, $y+3z=11$, $x-2y+z=0$	5	CO4	K3
4.a. Find a real root by using Newton Raphson Method of the function $f(x)=x^3-5x-6$	5	CO5	K3
b. $Show\ that\ \left(E^{\frac{1}{2}}+E^{\frac{-1}{2}}\right)(1+\Delta)^{\frac{1}{2}}=2+\Delta$	5	CO5	K2

(OR)

c. Find a real root by using Bisection Method for the function $f(x) = x^3 - 9x + 1$. — 5 — CO4 — K2

d. Solve the following system of equations by using Gauss Elimination Method $x + 2y + z = 3\ , 2x + 3y + 3z = 10\ , 3x - y + 2z = 13$ — 5 — CO4 — K3

5.a. Using Langrange's Interpolation formula, find $y(1.5)$ from the following table. — 5 — CO5 — K3

X	0	1	2	5
Y=f(x)	1	3	12	147

b. Find $f(21)\ by\ using$ Newtons for ward method — 5 — CO5 — K3

x	20	23	26	29
y	6	10	12	14

(OR)

c. Find out the missing term ''a'' by using finite difference table. — 5 — CO4 — K3

X	0	1	2	3	4
y	1	3	9	a	81

d. Find the $P(2)$ by using Newton's Interpolation — 5 — CO4 — K3

X	0	4	8	12	16
y	10	20	30	40	50

6.a. Find the mean, of the following data — 5 — CO4 — K3

Classes	0-10	10-20	20-30	30-40	40-50	50-60	60-70
Frequency	5	10	18	30	20	12	5

b. Find the correlation coefficient between x and y for the following data — 5 — CO4 — K3

x	70	90	80	74	65	83
y	74	84	63	87	78	90

(OR)

c. Find the Regression line of Y on X of the following data — 5 — CO5 — K3

X	27	25	22	20	18	17	16
Y	70	69	68	62	56	54	50

d. Fit a straight line by Least Square Method for the following data. — 5 — CO5 — K3

X	8	3	2	10	11	3	6	5	6	8
y	4	12	1	12	9	4	9	6	1	14

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