QP Code: R251A002 | Reg. No | | | | | | | | | | | AY 25

Gandhi Institute of Engineering and Technology University, Odisha, Gunupur
(GIET University)

B. Tech (First Semester - Regular) Examinations, December 2025

25FYBS110B1 – Applied Mathematics – I

(Biotechnology)

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)**

		CO #	Blooms Level
Q.1.	Answer ***ALL*** questions		
a.	Check whether $[(p \to q) \wedge q] \vee p$ is Tautology	CO1	K1
b.	Construct a matrix of Order 3×2 of $a_{ij} = \frac{1}{2}\lvert i - 3j \rvert$.	CO2	K2
c.	Write down Newtons Raphson's method.	CO1	K1
d.	Find an equation by Using Langrage's interpolation method	CO2	K2
e.	What is the probability of getting a sum of 9 when two dice are thrown?	CO1	K1

X	0	2	4
y	10	14	18

PART – B **(10 x 5 = 50 Marks)**

	Answer ***ALL*** the questions	Marks	CO #	Blooms Level
2. a.	Show that $p \vee (q \wedge r) and\ (p \vee q) \wedge (p \vee r)$ are logically equivalent.	5	CO3	K3
b.	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	K2
	(OR)			
c.	Prove by the method of Mathematical induction that $1 + 2 + 3 + \cdots + n = \frac{n(n+1)}{2}$.	5	CO3	K3
d.	Check whether $(p \to q) \to r\ and\ (p \to q) \wedge (q \to r)$ are logically equivalent or not.	5	CO2	K2
3.a.	Solve by Cramer's rule $x + y + z = 6$, $y + 3z = 11$, $x - 2y + z = 0$	5	CO3	K3
b.	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.	5	CO2	K2
	(OR)			
c.	Find the Inverse of the matrix $\begin{bmatrix} 2 & 1 & 3 \\ 4 & -1 & 0 \\ -7 & 2 & 1 \end{bmatrix}$.	5	CO3	K3

d. Express A=$\begin{bmatrix} 1 & 3 & 5 \\ -6 & 8 & 3 \\ -4 & 6 & 5 \end{bmatrix}$ in the form of symmetric and skew symmetric form. 5 CO2 K2

4.a. Find the real roots by using Bisection method of $x^3 - 3x + 1 = 0$ 5 CO3 K3

b. Show that $i. \Delta = \frac{\delta^2}{2} + \delta\sqrt{1 + \frac{\delta^2}{4}}$ $ii. E^{\frac{1}{2}} = \mu + \frac{\delta}{2}$ 5 CO2 K2

(OR)

c. Find the real root of $f(x) = x^3 - 5x - 6$ by using Newton-Raphson Method. 5 CO3 K3

d. Convert Binary to octal and Hexa decimal

i. $(10101010101100)_2$
ii. $(111101010101100)_2$
iii. $(10101011110101100)_2$

5 CO2 K2

5.a. Find the $P(35)$ by using Newtons 's Interpolation

X	0	10	20	30	40
Y	120	140	160	180	200

5 CO3 K3

b. Find out the missing term ''a'' by using finite difference table.

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

5 CO2 K2

(OR)

c. Find $f(21)$. $By\ using$ Newtons forward method

X	20	23	26	29
Y	6	10	12	14

5 CO3 K3

d. Find the $P(5)$ BY using Langrage's Interpolation

X	1	2	3	4	7
Y	2	4	8	16	128

5 CO2 K2

6.a. State and Prove Baye's Theorem. 5 CO3 K3

b. Find the probability that a leap year will have 53 Sundays. 5 CO2 K2

(OR)

c. If $P(A) = 0.8$, $P(B) = 0.5$, $P(B/A) = 0.4$ then Find i. P(A∩B) ii. P(A∪B) iii. $P(A|B)$. 5 CO3 K3

d. A factory has 3 machines: Machine A, Machine B, and Machine C, producing 50%, 30%, and 20% of the total output, respectively. Machines A, B, and C produce defective items at rates of 1%, 2%, and 3%. If an item is selected randomly and found to be defective, what is the probability it came from Machine B? 5 CO2 K2

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