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

B. Tech (Second Semester – Regular/Supplementary) Examinations, April – 2025

23BBSBS12001 - Engineering Mathematics-II

(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.	Find the distance between the points (2,3) and (4,5).	CO1	K1
b.	Find $\lim_{x\to 0}\frac{\sqrt{5+x}-\sqrt{5-x}}{x}$	CO1	K2
c.	Find the integration of $\int \frac{sin\sqrt{x}}{\sqrt{x}}dx$	CO1	K2
d.	What is the probability of getting a sum of 9 when two dice are thrown?	CO1	K1
e.	Find the gradient of F where $i.\ F = e^{xyz}\ ii.\ F = x^2 + y^2 + z^2$.	CO2	K2

PART – B **(10 x 5 = 50 Marks)**

Answer ***ALL*** the questions		Marks	CO #	Blooms Level
2. a.	Find the angle between two lines y =x and y = -x.	5	CO2	K2
b.	Find the equation of circle passing through the points $(3,4), (3,2)\ and\ (1,4)$.	5	CO2	K2
	(OR)			
c.	Find the equation of circle passing through the points $(2,3)\ and\ (4,5)$ and also find its centre and radius.	5	CO2	K2
d.	Show that A (-2,7), B (1,1) C(3,-3) are collinear.	5	CO2	K2
3.a.	Find the derivative of i.$e^{\sqrt{sinx}} + e^{\sqrt{cosx}}$ ii.$log\sqrt{sinx} + logcosx$	5	CO2	K2
b.	Find the derivative of *i.* $(x^2 + 2x - 1)^5$ *ii.* $\text{Cos}(\ln x)^2$	5	CO3	K3
	(OR)			
c.	Find the limit of $i.\lim_{x\to 1}\frac{2x^3-3x^2+1}{9x^2+8x+7}$ $ii.\lim_{x\to 0}\frac{\sqrt{5+x}-\sqrt{5-x}}{x}$	5	CO2	K3
d.	Find the derivative of i.$\frac{sinx}{e^x}$ ii. $\frac{1-tanx}{1+tanx}$	5	CO3	K3
4.a.	Find the integration i.$\int \frac{x^3+3x+4}{\sqrt{x}}dx$ ii. $\int \frac{x^3+5x^2-4}{x^2}dx$	5	CO3	K3
b.	Find the integration of $i.\int 2x\sqrt{1+x^2}\,dx$ ii. $\int \frac{Sin\sqrt{x}}{\sqrt{x}}dx$	5	CO3	K3
	(OR)			
c.	Find the integral of i.$\int xsinx\,dx$ ii. $\int xcosx\,dx$	5	CO2	K3
d.	Find the area under the curve f(x)=$x^2 - 2x + 2$ from x=1 to x=2	5	CO3	K3
5.a.	In a factory that produces bolts, three machines A, B, and Care responsible for manufacturing 25%, 35%, and 40% of the total bolts, respectively. The defect rates of these machines differ: machine A produces 5% defective bolts, machine B produces 4% defective bolts, and machine C produces 2% defective bolts. A	5	CO2	K2

	bolt is randomly selected from the overall production, and it is found to be defective. What is the probability/likelihood that this defective bolt was produced by machine B?			
b.	Two dice are rolled, find the probability that the sum of the number of both the dice is i) Equal to 2 ii) Equal to 5 iii.) Less than 12	5	CO3	K2
	(OR)			
c.	State and Prove Bayes Theorem.	5	CO2	K2
d.	If P(A)=0.8 P(B)=0.5, P$\left(\frac{B}{A}\right) = 0.4$ then Find i. P(A∩B) ii. P(A∪B) iii. $P(A\|B)$	5	CO3	K2
6.a.	Find the directional derivative of a function $f = x^2 + 3y^2 + 4z^2$ in the direction of a vector $(1, -1, -1)$ at a point $(1,0,1)$.	5	CO3	K2
b.	Find the angle between two normal surfaces $x^2 + y^2 + z^2 = 10$ and $x^2 + 2y^2 + 3z^2 = 15$ at point $P(2,3,4)$.	5	CO2	K2
	(OR)			
c.	Find the angle between the vectors $\vec{a}$ and $\vec{b} + \vec{c}$. $Where\ \ \vec{a} = \hat{\imath} + \hat{\jmath}$, $\vec{b} = 3\hat{\imath} + 2\hat{\jmath} + 3\hat{k}$ and $\vec{c} = \hat{\imath} + 2\hat{\jmath}$.	5	CO3	K2
d.	Find i.$Curl(gradf)$ ii. $div(curlf)$.	5	CO3	K3

--- End of Paper ---