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

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

23BBSBS12001 – Engineering Mathematics-II

(Common to all except 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. Form a Partial differential Equation by Elimination of arbitrary constants of z=(x-a)^2+(y-b)^2+1	CO1	K2
b. Find the Radius of Convergence of $\sum_{n=0}^{\infty}\frac{(4-2i)^n}{(1+5i)^n}(z)^n$	CO2	K3
c. Find the Laplace transform of the function $t\,cos3t$	CO3	K3
d. What do you mean by Directional derivative of a function? Explain?	CO4	K2
e. State the Stoke's theorem	CO5	K2

PART – B **(10 x 5 = 50 Marks)**

<u>Answer ***ALL*** the questions</u>	Marks	CO #	Blooms Level
2. a. Solve $x^2(y-z)p+y^2(z-x)q=z^2(x-y)$	5	CO1	K2
b. Solve $2xz-px^2-2qxy+pq=0$	5	CO1	K3
(OR)			
c. Solve qz - p^{2}y - q^{2}y = 0	5	CO1	K3
d. Solve $z(p-q)=z^2+(x+y)^2$	5	CO1	K2
3.a. Solve the Differential Equation $y''+9y=0$ by Power Series Method	5	CO2	K3
b. Find the Centre and Radius of Convergence of $\sum_{n=0}^{\infty}\frac{(n+5i)}{(2n)!}(z-i)^n$	5	CO2	K3
(OR)			
c. Solve the Differential Equation $y''-2xy=0$ by Power Series Method	5	CO2	K4
d. Verify that the Series is Convergent or Divergent $\sum_{n=0}^{\infty}\frac{(20+30i)^n}{n!}$	5	CO2	K4
4.a. Solve the following Integral Equation $y(t)=te^t-2e^t\int_0^t e^{-r}\,y(r)\,dr$	5	CO3	K3
b. Solve $y''-2y'+y=e^t\ at\ y(0)=2,\ y'(0)=-1$, Using Laplace transform	5	CO6	K3
(OR)			
c. Using convolution theorem, find Laplace inverse transformation of the following $\frac{S^2}{(S^2+a^2)^2}$	5	CO3	K3
d. Find the Laplace transformation of the following function $\frac{\cos 2t-\cos 3t}{t}$	5	CO3	K4
5.a. Find the Directional derivative of f *at point P in* the direction of vector	5	CO4	K4

	$a \quad where,\ f = \frac{1}{\sqrt{x^2+y^2+z^2}}$, where P: (-1, 2, 4) a = 2i - j +k.			
b.	Prove that $div\ (fv) = f.div\ v + v.\nabla f$	5	CO4	K4
	(OR)			
c.	Find the Tangent and Unit Tangent vector of the curve $r(t) = 2cost\hat{\imath} + 2sint\hat{\jmath} + t\hat{k}$ at the point (2,0,0)	5	CO4	K3
d.	Prove that $div\ (f\ X\ \ g) = g.curlf - f.curl\ g$	5	CO4	K3
6.a.	Evaluate $\int_0^3 \int_{-y}^{y} (x^2 + y^2) dx\ dy$	5	CO5	K3
b.	Calculate $\int_C F(r).ds$ where $f = \sqrt{2 + x^2 + 3y^2}$ $C : r = [t, t, t^2]$ $0 \le t \le 3$	5	CO5	K4
	(OR)			
c.	Using Greens theorem, Evaluate the line integral $\oint_C \mathbf{F} \cdot d\mathbf{r}$ $where\ F[x^2 e^y, y^2 e^x$],over the curve C; the rectangle with vertices (0,0), (2, 0), (2, 3), (0,3).	5	CO5	K4
d.	Evaluate the Integral $\int_{(0,1,2)}^{(1,-1,7)} 3x^2 dx + 2zydy + y^2 dz$ by Showing Integral is path Independent.	5	CO5	K4

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