

Reg.No:

--	--	--	--	--	--	--	--



SNS College of Technology, Coimbatore-35.

(An Autonomous Institution)

Internal Assessment -I

Academic Year 2022-2023 (Even)

Second Semester

(Common to All Branches)

Department of Mathematics

19MAB102-Integral Calculus & Laplace Transforms

Time: 1.30 Hours

Maximum Marks: 50

B

		PART – A (5 x 2 = 10 MARKS) ANSWER ALL QUESTIONS	CO	Blooms
1.		Evaluate $\int_0^1 \int_0^2 y^2 x \, dx \, dy$	CO1	(Rem)
2.		Evaluate $\int_0^1 \int_0^2 \int_0^3 xyz \, dx \, dy \, dz$	CO1	(Und)
3.		Find the gradient of $\phi = 3x^2y - y^3z^2$ at (1,-2,-1).	CO2	(Und)
4.		If $\vec{F} = xyz\vec{i} + 3x^2y\vec{j} + (xz^2 - y^2z)\vec{k}$ then find $\nabla \cdot \vec{F}$ at (1,2,-1).	CO2	(Und)
5.		Define solenoidal and irrotational vectors.	CO2	(Rem)
		PART –B (13+13+14 = 40 MARKS) ANSWER ALL QUESTIONS		
6.	a) i)	Evaluate $\int_0^1 \int_1^2 xy(x+y) \, dy \, dx$.	CO1	(Und) (6)
	ii)	Find the area of the circle $x^2 + y^2 = a^2$ using double integration.	CO1	(App) (7)
		(OR)		
	b)	Change the order of integration and evaluate $\int_0^{4a} \int_{x^2/4a}^{2\sqrt{ax}} dy \, dx$	CO1	(Ana) (13)

7.	a) i)	Find 'a' and 'b' such that the surfaces $ax^2 - byz = (a+2)x$ and $4x^2y + z^3 = 4$ cut orthogonally at the point (1,-1,2).	CO2	(App) (6)
	ii)	Prove that $\vec{F} = (y^2 \cos x + z^3)\vec{i} + (2y \sin x - 4)\vec{j} + 3xz^2\vec{k}$ is irrotational vector and find the scalar potential such that $\vec{F} = \nabla\phi$	CO2	(App) (7)
		(OR)		
	b) i)	Using Green's theorem, evaluate $\int_C (2x^2 - y^2)dx + (x^2 + y^2) dy$ where C is the boundary enclosed by the lines $x=0, y=0, x=2$ and $y=3$	CO2	(App) (7)
	ii)	Find the unit normal to the surface $x^2 + 2y^2 + z^2 = 7$ at (1,0,3).	CO2	(App) (6)
8.	a)	Evaluate $\int_0^1 \int_0^{\sqrt{1-x^2}} \int_0^{\sqrt{1-x^2-y^2}} xyz dz dy dx$	CO1	(App) (14)
		(OR)		
	b)	Find the volume of the sphere $x^2 + y^2 + z^2 = a^2$ using triple integration.	CO1	(Ana) (14)

Rem/Und: Remember/ Understand **App:** Apply **Ana:** Analyze **Eva:** Evaluate

Cre: Create

Prepared by

Verified by

Dean(S&H)