Reg.No: | | | | | | | |

SNS College of Technology, Coimbatore-35.
(An Autonomous Institution)
Internal Assessment -II
Academic Year 2022-2023(Even)
First Semester
(Common to All Branches)
Department of Mathematics
19MAB102- Integral Calculus & Laplace Transform

A

Time: 1 Hours 30 Min **Maximum Marks: 50**

PART – A (5 x 2 = 10 MARKS)
ANSWER ALL QUESTIONS

		CO	BLOOMS
1.	State Gauss Divergence theorem.	CO2	Rem
2.	If $\vec{F}=(x^2+yz)\vec{i}+(y^2+2zx)\vec{j}+(z^2+3xy)\vec{k}$ then find $\nabla\times\vec{F}$ at the point (2,-1,2).	CO2	Und
3.	Test the analyticity of the function $w=\bar{z}$.	CO3	Und
4.	Define Conformal Mapping.	CO3	Rem
5.	Interpret the fixed point of the transformation $w=\frac{6z-9}{z}$.	CO3	Und

PART –B (2*13= 26 MARKS + 1*14=14 MARKS)
ANSWER ALL QUESTIONS

6. a) Make use of Stokes's theorem to verify the $\vec{F}=(x^2+y^2)\vec{i}-2xy\vec{j}$ taken around the rectangle bounded by the lines $x=\pm a, y=0, y=b$. CO2 Ana (13)

(OR)

b) i) Examine that $\left(\frac{\partial^2}{\partial x^2}+\frac{\partial^2}{\partial y^2}\right)|f(z)|^2=4|f'(z)|^2$. CO3 Ana (10)

ii) If $f(z)$ and $\overline{f(z)}$ are analytic then prove that $f(z)$ is constant. CO3 App (3)

7. a) i) Construct the analytic function whose imaginary part is $V=x^3-3xy^2+3x^2-3y^2+1$. CO3 App (7)

ii) Identify the image of the infinite ship $\frac{1}{4}\le y\le\frac{1}{2}$ under the transformation $w=\frac{1}{z}$. CO3 App (6)

(OR)

b) i) Inspect that the function $U=e^{-x}(x\sin y-y\cos y)$ is harmonic and find its harmonic conjugate. CO3 App (8)

ii) Build the bilinear transformation that maps $0,1,\infty$ of the z-plane into $-5,-1,3$ of the w- Plane. CO3 App (5)

8. a) Using Gauss divergence theorem ,verify the $\vec{F}=4xz\vec{i}-y^2\vec{j}+yz\vec{k}$ over the cube $x=0,x=1,y=0,y=1,z=0,z=1$. CO2 Ana (14)

(OR)

b) Prioritize the fluid flow of analytic functions & also find if $xy(x^2-y^2)$ can represent the stream function . If so, find the corresponding velocity potential and also the complex potential. CO3 App (14)

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