	Reg. No.:	
	Name :	

VIT BHOPAL
www.vitbhopal.ac.in

TERM END EXAMINATIONS (TEE) – December 2021-January 2022

Programme	**B.Tech.-MIM,BCE,BAC,BAI, BAS, BCE,BCG,BCY,BEC,BSA**	**Semester**	**Fall 2021-22**
Course Name	**Calculus and Laplace Transforms**	**Course Code**	**MAT1001**
Faculty Name	**Dr. Bhumika Choksi**	**Slot / Class No**	**B11+B12+B13/0148**
Time	**1½ hours**	**Max. Marks**	**50**

Answer ALL the Questions

Q. No.		Question Description	Marks
		PART - A – (3 x 10 = 30 Marks)	
1	**(a)**	If $\theta = t^n e^{-\frac{r^2}{4t}}$ then **find 'n'** such that $\frac{1}{r^2}\frac{\partial}{\partial r}\left(r^2\frac{\partial\theta}{\partial r}\right) = \frac{\partial\theta}{\partial t}$.	**10**
		OR	
	(b)	Evaluate $\int_0^2 \int_y^{2+\sqrt{4-2y}} dA$ **by changing the order of integration**.	**10**
2	**(a)**	Verify Stokes' theorem for $\bar{A} = (x+y)\hat{\imath} + (y+z)\hat{\jmath} - x\hat{k}$ over the surface in the first octant of the plane $2x + y + z = 2$.	**10**
		OR	
	(b)	Solve $y'' + 4y = sec2t;\ y' \equiv \frac{d}{dt}$ by Variation of Parameter method.	**10**
3	**(a)**	Solve $4x^2y'' + y = 19\cos(lnx) + 22\sin(lnx);\ y' \equiv \frac{d}{dx}$.	**10**
		OR	
	(b)	Evaluate $\int_0^\infty e^{-t}(t\int_0^t e^{-4u}cosu\ du)\ dt$.	**10**
		Part - B – (2 x 10 = 20 Marks)	
4		Evaluate $\int_0^a \int_y^a \frac{x}{x^2+y^2} dxdy$ by transforming it into polar coordinates.	**10**
5		Find inverse Laplace transform of $\frac{s+2}{(s^2+4s+5)^2}$.	**10**

⇔⇔⇔