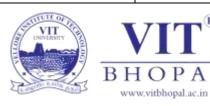
Reg. No.:	
Name :	



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

Programme	B.Tech	Semester	Fall 2021-2022
Course Name	Calculus and Laplace transforms	Course Code	MAT1001
<b>Faculty Name</b>	Dr. A.Manickam	Slot / Class No	A11+A12+A13/0608
Time	1½ hours	Max. Marks	50

## **Answer ALL the Questions**

Q. No.		Question Description	Marks		
	· I	$PART - A - (3 \times 10 = 30 \text{ Marks})$	,		
1	(a)	Find the dimensions of the rectangular box without a top			
		of maximum capacity, whose surface is 108 sq.cm	10		
		OR	<u> </u>		
	(b)	Evaluate $\iiint \frac{dzdydx}{(x+y+z+1)^3}$ where v is the region bounded by	10		
		the lines $x = 0, y = 0, z = 0$ $x + y + z = 1$	10		
2	(a)	Verify Green's theorem in a plane for the integral	10		
		$\int_{C} (y - \sin x) dx + \cos x dy \text{ using Green's theorem}$			
		where C is triangle OAB where $O(0,0)$ ; $A(\frac{\pi}{2},0)$ ;			
		$B\left(\frac{\pi}{2},1\right)$			
	OR				
	(b)	Solve $(D^2 - 4D + 4)y = 8(x^2 + \sin 2x + e^{2x})$	10		
3	(a)	Solve by using the method of undetermined coefficients	10		
		$x^2 \frac{d^2 y}{dx^2} - 4x \frac{dy}{dx} + 6y = x^2 + \log x$			
	OR				
	(b) Apply the convolution theorem to find the inverse				
		Laplace transform of the function $\frac{s^2}{(s^2+4)(s^2+9)}$	10		

	Part - B - $(2 \times 10 = 20 \text{ Marks})$				
4	Obtain Taylor series expansion of $\tan^{-1} \left( \frac{y}{x} \right)$ about(1,1) up to second degree terms.	10			
5	Find the Laplace transform of the half sine wave rectifier function given by $f(t) = \begin{cases} sint, & 0 < t < \pi \\ 0, & \pi < t < 2\pi \end{cases}$ & $f(t+2\pi) = f(t)$ , for all values of $t$	10			
$\Leftrightarrow \Leftrightarrow \Leftrightarrow$					