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**Presidency University**

**Bengaluru**

 **SCHOOL OF ENGINEERING**

**MAKEUP EXAMINATION- JAN 2023**

**Course Code**: MAT2001

**Course Name**: Transform Techniques and Partial differential Equations

**Program** : B.Tech – All Programs

**Date**: 20-JAN-2023

**Time**:01.00 PM-04.00 PM

**Max Marks**: 100

**Weightage**: 50%

**Instructions:**

1. *Read the question properly and answer accordingly.*
2. *Question paper consists of 3 parts.*
3. *Scientific and Non-programmable calculators are permitted*

**Part A [Memory Recall Questions]**

**Answer all the Questions. Each Question carries Five marks. (4Qx 5M= 20M)**

1. Find the Laplace transform of 

 (CO.No1.)[Comprehension level]

2. Find the Fourier Sine transform of 

 (C.O.No 2.) [Comprehension level]

 3. 

 (C.O.No 3.) [Comprehension level]

4. Form the PDE by eliminating the arbitrary functions from $z=f\_{1}\left(y+2x\right)+f\_{2}(y-3x)$.

 (C.O.No 4.) [Comprehension level]

 **Part B [Thought Provoking Questions]**

**Answer all the Questions. Each Question carries TEN marks. (5Qx10M=50M)**

5. . Express $f\left(t\right)=\left\{\begin{matrix}t-1 for 1<t<2\\3-t for 2<t<3\end{matrix}\right.$ in terms of unit step function and hence find its

 Laplace transform. (C.O. No. 1) [Comprehension]

6. Evaluate $L^{-1}\left[\frac{1}{s\left(s^{2}+4\right)}\right]$ using convolution theorem. (C.O. No. 1) [Comprehension]

7. Find the Fourier transform of  , hence evaluate 

 (C.O.NO 2) [Comprehension level]

8. Solve $\frac{d^{2}z}{dx^{2}}+4z=0$, given that when $x=0, z=e^{2y} and\frac{∂z}{∂x}=2$.

 (C.O. No. 4) [Comprehension]

9. Solve $xp+yq=3z.$ (C.O. No. 4) [Comprehension]

 **Part C [Problem Solving Questions]**

**Answer all the Questions. Each Question carries FIFTEEN marks. (2Qx15M=30M)**

10. Apply Laplace transform technique to solve $\frac{d^{2}y}{dt^{2}}-y=t$ with $y\left(0\right)=0$ & $y^{'}\left(0\right)=0$. (C.O. No. 1) [Application]

11. Using Z-Transform solve the difference equation.

 (C.O. No. 3) [Application]