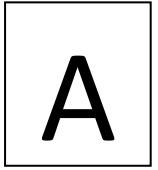




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**SNS College of Technology, Coimbatore-35.**  
**(An Autonomous Institution)**  
**Internal Assessment -II**  
**Academic Year 2022-2023(Odd)**  
**Third Semester**  
**Department of Mathematics**  
**19MAT201- Transforms And Partial Differential Equations**



Time: 1.30 Hours

Maximum Marks: 50

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

BLOOMS

1. State linear property for Fourier transform CO2 (Rem)
2. Find the Fourier Cosine transform of  $2e^{-3x} + 3e^{-2x}$  CO2 (Und)
3. Form the PDE by eliminating arbitrary constants a and b from  $z = (x - a)^2 + (y - b)^2 + 1$  CO3 (App)
4. Find the complete integral for the PDE  $p - q = 0$  CO3 (App)
5. Solve  $(D^2 + DD' - 6D'^2)z = 0$  CO3 (App)

**PART –B (13+13+14 = 40 MARKS)**  
**ANSWER ALL QUESTIONS**

- 6.
- a)i) Find the Fourier Sine transform of  $\frac{e^{-ax}}{x}$  and hence find CO2 (App) (7)  
$$F_S \left[ \frac{e^{-ax} - e^{-bx}}{x} \right]$$
  - ii) Evaluate  $\int_0^{\infty} \frac{x^2 dx}{(x^2 + a^2)^2}$  CO2 (App) (6)
- (or)
- b)i) Find the Fourier cosine transform of  $f(x) = e^{-a|x|}$  and hence (App)  
show that  $\int_0^{\infty} \frac{\cos sx}{s^2 + a^2} dx = \frac{\pi}{2a} e^{-as}$  CO2 (7)
  - ii) Using Parseval's identity evaluate  $\int_0^{\infty} \frac{dx}{(x^2 + a^2)(x^2 + b^2)}$  CO2 (APP) (6)

7. a) i) Solve  $z = px + qy + pq$  CO3 (App) (7)
- ii) Form the PDE by eliminating the arbitrary function from  
 $\varphi(x^2 + y^2 + z^2, ax + by + cz) = 0$  CO3 (App) (6)
- (or)
- b) i) Solve  $(3z - 4y)p + (4x - 2z)q = 2y - 3x$  CO3 (App) (7)
- ii) Solve  $(D^2 - 3DD' + D'^2)z = \cos(2x + 3y)$  CO3 (App) (6)
8. a) i) Define self reciprocal and analyze whether the function  $e^{-a^2x^2}$  is self reciprocal under fourier transform CO2 (Ana) (7)
- ii) Solve  $(D^2 - 4DD' + 4D'^2)z = e^{2x+y}$  CO3 (App) (7)
- (or)
- b) i) Elaborate the applications of Partial differential equations in real life, Engineering and Industry. CO3 (App) (7)
- ii) Solve  $(D^2 + DD' - 6D'^2)z = y \cos x$  CO3 (App) (7)

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