

**TT 3001 (CH 3001/CS 3001/CE 3001/ME 3001/ET 3001/EE 3001)**

**PART - B**

**III Semester B.TECH in (Chemical/Civil/Computer/Textile/Mechanical/  
Electrical/Electronics and Tele Communication) Engineering**

**Examination, August 2011**

**ENGINEERING MATHEMATICS**

**Time : 3 Hours**

**Max. Marks : 75**

**Instruction : Answer any five questions from Part - A and Part - B.**

**PART - A**

**Answer any five questions :**

**(5x5=25)**

1. **Form partial differential equation by eliminating the arbitrary constants from  $z = ax + by + a$ .**

2. **Explain the method of separation of variables.**

3. **Solve  $p^2 + q^2 = x^2 + y^2$ .**

4. **Explain method one which is used to solve for the rate of heat flow through an object.**

5. **Explain briefly the properties of sine and cosine transforms.**

6. **State the Fourier integral theorem.**

7. **Give the correlation function.**

8. **Describe the properties of the Fourier transform.**

**P.T.O.**

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PART – B

Answer any five questions : (5×10=50)

9. Form partial differential equation by eliminating the arbitrary functions  $f$  and  $g$  in  $z = x^2 f(y) + y^2 g(x)$ .
10. Find the Fourier series of  $f(x)=x$  in  $(0, \pi)$
11. Obtain the Fourier expansion of  $f(x) = \frac{1}{2}(\pi - x)$  in  $-\pi < x < \pi$ .
12. Find the steady state temperature distribution in a square plate bounded by the lines  $x = 0, y = 0, x = 20, y = 20$ . It's surfaces are insulated satisfying the boundary conditions  $U(0, y) = U(20, y) = U(x, 20) = x(20-x)$ .
13. Find the Fourier transform of  $f(x) = \{x, |x| < a\}$ .
14. Evaluate integral 0 to infinity  $dx/(x^2 + a^2)(x^2 + b^2)$  using transforms.
15. Solve the difference equation using Z transform method :  
 $y_{n+2} - 3y_{n+1} + 2y_n = 2^n$  given that  $y(0)=0, y(1)=0$ .
16. Prove the convolution theorem.