

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.

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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.