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

III Semester B.Tech. in (Chemical/Civil/Computer/Textile/Mechanical/Electrical/Electronics and Tele Communication) Engineering Examination, August 2011
MATHEMATICS – III

Time : 3 Hours   Max. Marks : 75

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

PART – A

Answer **any five** questions :   (5×5=25)

1) Solve : $p^2 y(1 + x^2) = qx^2$.

2) Find the singular integral of $z = px + qy + p^2 - q^2$.

3) Obtain the half range cosine series for $f(x) = x$ in $(0, \pi)$.

4) Write the differences between the solution of one dimensional wave equation and one dimensional heat equation.

5) In steady state conditions derive the solution of one dimensional heat flow equation.

6) State the Fourier transforms of the derivatives of a function.

7) Find $z[a^n/n!]$ in z transform.

8) Find the z transform of $\{1/n\}$.

PART – B

Answer **any five** questions :   (5×10=50)

9) Form a partial differential equation by elimination arbitrary functions from $z = xf(2x + y) + g(2x + y)$.

10) Solve $(x^2 + y^2 + yz) p + (x^2 + y^2 - xz) q = z(x + y)$.

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11) Solve $Z = p^2 + q^2$.

12) Find the Fourier series for $f(x) = |\cos x|$ in the interval $(-\pi, \pi)$.

13) A metal bar 10 cm long with insulated sides has its ends A and B kept at 20°C and 40°C respectively until steady state condition prevail. The temperature at A is then suddenly raised to 50°C and at the same instant that at B is lowered to 10°C. Find the subsequent temperature at any point at the bar at any time.

14) Evaluate integral 0 to infinity dx/(x square + a square) (x square + b square) using transforms.

15) State and prove the second shifting theorem in Z transform.

16) Find the Z-transform of $\{a^n\}$ and $\{na^n\}$.

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