Subject Code: R10202/R10

| Set No - 1 |

I B.Tech II Semester Supplementary Examinations Dec./Jan. – 2015/2016
MATHEMATICS – II
(Common to All Branches)

Time: 3 hours   **Max. Marks: 75**

Answer any FIVE Questions
All Questions carry equal marks
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1. (a) Find the Laplace transform of $e^t \cos 4t \sin t$
   (b) Find the Laplace transform of Dirac-delta function

   [7+8]

2. (a) Find $L^{-1}\left[\dfrac{s^2 + 2s - 4}{(s^2 + 9)(s - 5)}\right]$

   (b) Using Laplace transform method solve $(D^2 + 5D - 6)y = t^2 e^{-t}, \ y(0) = a, \ y^1(0) = b.$

   [7+8]

3. (a) Find the Half range sine series of f(x) = x(l-x) , in 0<x<l . Hence Evaluate
   $\dfrac{1}{1^3} - \dfrac{1}{3^3} + \dfrac{1}{5^3} - .....$

   (b) Expand coshax as a Fourier series in (-π, π)

   [8+7]

4. (a) Using Fourier integral show that $e^{-bx} = \dfrac{2b}{\pi}\int_0^\infty \dfrac{\cos \lambda x}{\lambda^2 + b^2}d\lambda, (b > 0)$

   (b) Find the inverse Fourier transform of $F(s) = e^{-|s|y}$

   [8+7]

5. (a) Solve the PDE $(x^2 + y^2)(p^2 + q^2) = 1$
   (b) Solve the PDE $(x^2 - yz)p + (y^2 - zx)q = z^2 - xy$

   [7+8]

6. A tightly Stretched string with fixed end points x = 0 and x = l is initially at rest in its equilibrium position. If it is vibrating by giving to each of its points a velocity $\lambda x(l - x)$, find the displacement of the string at any distance x from one end at any time

   [15]

7. (a) Find $Z^{-1}\left[\dfrac{8z - z^3}{(4 - z)^3}\right]$

   (b) Find $Z\left[\cos\left(\dfrac{n\pi}{2} + \theta\right)\right]$

   [8+7]

8. (a) Prove that $\int_a^b (x - b)^{m-1}(a - x)^{n-1}dx = (a - b)^{m+n-1}\beta(m, n)$

   (b) Evaluate $\int_0^1 \dfrac{x}{\sqrt{1 - x^5}}dx$

   [8+7]

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