Subject Code: R10202/R10 **Set No - 1**

I B. Tech II Semester Supplementary Examinations April/May - 2017

MATHEMATICS-II

(Common to All Branches)

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

Answer any FIVE Questions
All Questions carry equal marks

* * * * *

1. (a) Find the Laplace transform of unit step function.
   (b) Find the L[1-cost/t].

   [7+8]

2. (a) Find $L^{-1}\left\{\log\left(\frac{s+1}{s-1}\right)\right\}$.
   (b) Solve $(D^2+2D-3)y = sint; y(0) = y'(0) = 0$, using Laplace transforms.

   [7+8]

3. (a) Expand $\frac{\pi^2}{12} - \frac{x^2}{4}$ as a Fourier series in (-π, π).
   (b) Find the Half range cosine series of f(x) = 4x in [0, 2].

   [8+7]

4. (a) Prove that $F\{x^n f(x)\} = (-i)^n \frac{d^n}{dp^n}[F(p)]$
   (b) Find finite Fourier cosine transform of f(x) = x + a for 0 < x< π.

   [8+7]

5. (a) Form the P.D.E. by eliminating ϕ from $\phi(x+y+z, x^2+y^2-z^2) = 0$.
   (b) Solve $(y+z)p - (z+x)q = x - y$.

   [7+8]

6. Solve $\frac{\partial^2 u}{\partial x^2} + \frac{\partial^2 u}{\partial y^2} = 0$, subject to the conditions $u(0,y) = u(l,y) = u(x,0) = 0$ and $u(x,a) = \sin\frac{n\pi x}{l}$. [15]

7. (a) Find u_2, u_3 if $\bar{u}(z) = \frac{(2z^2+5z+14)}{(z-1)^4}$.
   (b) Find the inverse Z- transform of $\frac{4z^2-2z}{z^3-5z^2+8z-4}$.

   [7+8]

8. (a) Show that $\beta(m,n) = \int_0^\infty \frac{x^{m-1}}{(1+x)^{m+n}}dx = \int_0^\infty \frac{x^{n-1}}{(1+x)^{m+n}}dx$
   (b) Evaluate $4\int_0^\infty \frac{x^2}{1+x^4}dx$ using beta gamma function.

   [8+7]

*****