Subject Code: R13102/R13 **Set No - 1**

I B. Tech I Semester Supplementary Examinations May/June - 2016

MATHEMATICS-I

(Common to All Branches)

Time: 3 hours **Max. Marks: 70**

Question Paper Consists of **Part-A** and **Part-B**
Answering the question in **Part-A** is Compulsory,
Three Questions should be answered from **Part-B**
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PART-A

1. (a) Solve the D.E $(3xy^2 - y^3)dx - (2yx^2 - xy^2)dy = 0$
   (b) Find the Particular integral of $(D^2+a^2)\,y = \text{cosec}\,ax$
   (c) Find $J\left(\frac{u,v}{x,y}\right)$ if $u = \frac{x+y}{1-xy}, v = tan^{-1}(x) + \tan^{-1}(y)$
   (d) Find $L^{-1}\left(\frac{s^2}{(s-3)^2}\right)$
   (e) Solve $px^2+qy^2=z(x + y)$
   (f) Write the possible solutions of one dimensional heat equations.

[4+4+3+4+4+3]

PART-B

2. (a) Find the orthogonal trajectories $x^2+(y-c)^2 = c^2$ where c is a arbitrary constant
   (b) Bacteria in a culture grows exponentially so that the initial number has doubled in three hours .How many times the initial number will be present after 9 hours.

[8+8]

3. (a) Solve the D.E $\left(D^3 + 2D^2 - D - 2\right) y = 1 - 4x^3$
   (b) Solve the D.E $(D^2 - 4D + 4)y = 8x^2 e^{2x} \sin 2x$

[8+8]

4. (a) Find (i) $L(te^{at}\sin bt)$ (ii) $L^{-1}\left(\frac{s}{(s^2+1)^2}\right)$
   (b) By apply Laplace transform method solve the D.E
   $(D^2 + 4D + 3)y = e^{-t}$ $y(0) = 1,\ y^1(0) = 1.$

[8+8]

5. (a) Find the extreme of $f(x, y) = 2(x^2-y^2)-x^4 +y^4$
   (b) Expand $e^x \sin y$ in terms of x and y by Taylors method

[8+8]

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

[8+8]

7. A rectangular plate is bounded by the lines x = 0 , y = 0 , x = a , y = b and the edge temperatures are u(0,y) = 0 = u(a, y) and u(x,0) = $5\sin(5\pi x/a) + 35\sin(3\pi x/a)$ .Find the steady state temperature.

[16]

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