

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**

\*\*\*\*\*

**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  $(D^2 + a^2)y = \operatorname{cosec} x$
- (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  $(D^3 + 2D^2 - D - 2)y = 1 - 4x^3$
  - (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  
 $(D^2 + 4D + 3)y = e^{-t}$   $y(0) = 1$ ,  $y'(0) = 1$ .
- [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  $(x^2 + y^2)(p^2 + q^2) = 1$
  - (b) Solve the PDE  $(x^2 - yz)p + (y^2 - zx)q = (z^2 - xy)$
- [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]

\*\*\*

