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Code No: R13102 **R13** SET - 1

I B. Tech I Semester Supplementary Examinations, May - 2018
MATHEMATICS-I
(Com. to All branches)

Time: 3 hours Max. Marks: 70

Note: 1. Question Paper consists of two parts (**Part-A** and **Part-B**)
2. Answer **ALL** the question in **Part-A**
3. Answer any **THREE** Questions from **Part-B**

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PART –A

1. a) Find the integrating factor for the non exact differential equation. (4M)
$x^2ydx-(x^3+y^3)dy=0.$

b) Find the solution of $y^{11}+y=\cos 2x$. (4M)

c) If $L(\cos 2t)=\frac{s}{s^2+4}$ then find $L\left(\int_0^t \cos 2t dt\right)$. (4M)

d) Find the inverse Laplace transform of $\left(\frac{1}{s(s+a)}\right)$. (4M)

e) Formulate the partial differential equation from z=(x+a)(y+b) by eliminating 'a' and 'b'. (3M)

f) Find the solution of the partial differential equation p+q = pq. (3M)

PART -B

2. a) Solve $(xe^{xy}+2y)\frac{dy}{dx}+ye^{xy}=0.$ (8M)

b) A metal ball is heated to a temperature of 100^0C and at time t = 0 it is placed in water which is maintained at 40^0C. If the temperature of the ball reduces to 60^0C in 4 minutes, find the time at which the temperature of the ball is 50^0 C. (8M)

3. a) Solve $(D^3-3D^2+4)y=e^{2x}+6+80Cos2x.$ (8M)

b) Solve $(D^2-3D+2)y=2x^2e^x.$ (8M)

4. a) Find $L\left[\int_0^t \frac{1-e^{-u}}{u}du\right]$. (8M)

b) Solve $y'''-3y''+3y'-y=t^2e^t$ given that $y=1, y'=0, y''=-2$ at t = 0. (8M)

5. a) Determine whether the functions U $=\frac{x}{y-z}$, V $=\frac{y}{z-x}$, W=$\frac{z}{x-y}$ are dependent. (8M)
If dependent find the relationship between them.

b) Investigate the maxima and minima, if any, of the function $f(x) = x^3y^2(1-x-y)$. (8M)

6. a) Form the p.d.e by eliminating the arbitrary function f from $xyz=f(x^2+y^2+z^2)$. (8M)

b) Solve $(x^2-yz)p+(y^2-zx)q=z^2-xy$. (8M)

7. a) Solve PDE $\frac{\partial u}{\partial x}-2\frac{\partial u}{\partial y}=u$ and $u(x,0)=3.e^{-5x}+2.e^{-3x}$. (8M)

b) A tightly stretched string with fixed end points x = 0 and x = L is initially in a position given by $y=y_0 \sin^3\left(\frac{\pi x}{L}\right)$. If it is released from rest from this position; find the displacement y(x, t). (8M)

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