Code No: R10102 **R10** SET - 1

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

Time: 3 hours Max. Marks: 75

Answer any **FIVE** Questions
All Questions carry **Equal** Marks
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1. a) Solve $(1+xy)xdy+(1-xy)ydx=0$. (8M)
   b) Find the orthogonal trajectories of the family of circles $x^2+(y-c)^2=c^2$. (7M)

2. a) Solve $(D^2+3D+2)y=e^{-x}+cosx$. (8M)
   b) Solve $(D^2-2D+1)y=xe^xSinx$. (7M)

3. a) If x + y + z = u, y + z = uv, z = uvw, then evaluate $\frac{\partial(x,y,z)}{\partial(u,v,w)}$. (8M)
   b) Find Maclaurin's series expansion of the f(x, y) = $\sin^2 x$ and hence find the approximate value of $\sin^2 16^\circ$. (7M)

4. Trace the curve x = a (θ + sinθ), y = a (1 – cosθ). (15M)

5. a) Find the volume of the solid generated by the revolution of the area bounded by $y = x^2$ and y = x about y – axis. (8M)
   b) Prove that the length of the arc of a loop of the curve $9ay^2 = x(x-3a)^2$ is $4\sqrt{3}a$. (7M)

6. a) Evaluate $\iint_R xydxdy$ where R is the region bounded by the x-axis, ordinate $x=2a$ and the curve $x^2=4ay$. (8M)
   b) By changing the order of integration, evaluate $\int_0^3\int_1^{\sqrt{4-y}}(x+y)dxdy$. (7M)

7. a) Find the directional derivative of the function f = $x^2-y^2+2z^2$ at the point P=(1,2,3) in the direction of the line PQ where Q = (5,0,4). (8M)
   b) Find div $\bar{f}$ where $\bar{f}=r^n\bar{r}$ and find n if it is solenoidal. (7M)

8. Verify Stoke's theorem for $\overline{F}=(2x-y)\bar{i}-yz^2\bar{j}-y^2z\bar{k}$ over the upper half of surface of sphere $x^2+y^2+z^2=1$ bounded by the projection of the xy- plane. (15M)
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