Code : 9ABS104 4

B.TECH. I Year(R09) Regular Examinations, May/June 2010
MATHEMATICS-I
(Common to all branches)

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

Answer any FIVE questions
All questions carry equal marks
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1. (a) Solve : (i) $\frac{ydx-xdy}{x^2} + e^{y^2}dy^2 = 0$
   (ii) $\frac{ydx-xdy}{xy} + 2x\sin x^2 dx = 0$
   (b) Solve: (i) ydx + xdy + xy (ydx - xdy) = 0
   (ii) xdy + 2ydx = 2y2xdy
2. (a) Solve : (D2 + 5D + 6)y = ex
   (b) Solve : (D2 + 6D + 9) y = 2 e-3x
3. (a) Verify Rolle's theorem for f(x) = x2 - 5x + 6 in [2, 3].
   (b) Examine if Rolle's theorem is applicable for the function f(x) = tan x in [0,].
4. (a) Trace the curve x = a(θ + sin θ), y = a(1 + cos θ).
   (b) Trace the curve x = a(θ - sin θ), y = a(1 - cos θ).
5. (a) Evaluate $\int_0^3 \int_1^2 xy(1+x+y)dy\ \ dx$
   (b) Evaluate the integral by changing the order of integration $\int_0^3 \int_1^{\sqrt{4-y}} (x+y)dx\ \ dy$.
6. (a) Find the Laplace transform of i) $\left\{\frac{\sin 3t.\cos t}{t}\right\}$.
   ii) $\left\{t^2 \sin 2t\right\}$.
   (b) Find $L^{-1}\left\{\frac{s+1}{(s2+2s+2)^2}\right\}$.
7. (a) Using Laplace transform, evaluate $\int_0^\infty \frac{(\cos 5t - \cos 3t)}{t}dt$.
   (b) Solve the D.E. $\frac{d^2x}{dt^2} + 9x = \sin t$ Using L.T. given that $x(0) = 1, x\left(\frac{\pi}{2}\right) = 1$.
8. (a) Find the angle between the surfaces $x^2 + y^2 + z^2 = 9 and z = x^2 + y^2 - 3$ at the point (2,-1, 2).
   (b) Apply Greens theorem to evaluate $\int_c [(2x^2 - y^2)dx + (x^2 + y^2)dy]$, where C is the boundary of the area enclosed by the x-axis and upper half of the circle $x^2 + y^2 = a^2$.

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