Silicon
beyond teaching

Silicon Institute of Technology
Silicon Hills, Bhubaneswar
| An Autonomous Institute |

1st Semester B.Tech Mid Term Examination 2019-2020
ENGINEERING MATHEMATICS-1(18BS1T01)

Duration: 01:30 Full Marks: 25

1 ***Answer All***

a What is the curvature at any point on a circle with radius 5? 1

b Find the asymptotes to the curve $xy^3 - x^2y + xy + 2x - y - 6 = 0$ which are parallel to the axes. 1

c $Solve\ y' = \frac{\sqrt{y^2-1}}{x^2+25}$. 1

d Solve $y'=e^xe^y$. 1

e Find the integrating factor of $2xydx+3x^2dy=0$. 1

2 ***Answer any Two***

a Find the radius of curvature for the curve given parametrically by x = 3t and $y = t^2 - 6$ at t=1 2

b Find all the asymptotes of $r = \frac{a\theta}{\theta-1}$. 2

c Draw the graph of the function $y = 2x + [x-1]^2,\ 0 \leq x \leq 2$. 2

d Find all the asymptotes of $x^3-x^2y+y^2=0$. 2

3 ***Answer any Two***

a Solve the homogeneous equation $xy'-y=xy$. 2

b $Solve\ xy' + 4y = 8x^4$ where $y(1) = 2$ 2

c Solve the linear differential equation $\frac{dx}{dy} + \frac{x}{y} = y^2$. 2

d $Solve\ (x+y)dy = dx - dy$ 2

4 ***Answer any Two***

a Find the radius of curvature of the curve x=acos3t, $y = a\sin^3 t\ at\ t = \frac{\pi}{4}$. 3

b Find the ranges for the value of x for which $y = x^4 - 6x^3 + 12x^2 + 5x + 7$ is concave upward or downward. Also find the points of inflection. 3

c Find all the asymptotes to the curve $(x+y)^2(x+2y+2) = x + 9y - 2$. 3

d Find all asymptotes of the curve $(x+y)(x-y)(2x-y) - 4x(x-2y) + 4x = 0$ 3

5 ***Answer any Two***

a Find the integrating factor of $2x\tan y\,dx+\sec^2 y\,dy=0$ and solve it. 3

b Solve $2xyy' +(x-1)y^2=x^2e^x$ 3

c Solve the Bernoulli's equation $y'+y/x= x^2y^2$. 3

d $Solve\ \frac{dy}{dx} = \frac{x+2y+3}{2x+y+3}$ 3

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