Q.P. Code: 16HS602 **R16**

Reg. No: | | | | | | | | | | |

SIDDHARTH INSTITUTE OF ENGINEERING & TECHNOLOGY:: PUTTUR

(AUTONOMOUS)

B.Tech I Year I Semester Supplementary Examinations June 2019

ENGINEERING MATHEMATICS - I

(Common to all Branches)

Time: **3 hours** Max. Marks: **60**

(Answer all Five Units **5 X 12 = 60** Marks)

UNIT-I

1 **a** Solve $x\,dy - y\,dx = \sqrt{x^2+y^2}\,dx.$ 5M

b Find the orthogonal trajectories of the cardioids $r = a(1-\cos\theta).$ 7M

OR

2 **a** A body is originally at 80^0c and cools down to 60^0c in 20 min. If the temperature of the air is 40^0c, find the temperature of the body after 40 min.? 6M

b Solve $(D^2-4D)y = e^x + \sin 3x\cos 2x.$ 6M

UNIT-II

3 **a** S.T. $\sin^{-1}x = x + \frac{x^3}{3!} + \frac{1^2.3^2}{5!}x^5 + \frac{1^2.3^2.5^2}{7!}x^7 + \ldots\ldots$ 6M

b Find a shortest and longest distance from the point (1,2,-1) to the sphere $x^2+y^2+z^2 = 24.$ 6M

OR

4 **a** Using Maclaurin's series expand $\sin x\cos y$ up to the terms of third degree. 6M

b In a plane triangle, find the maximum value of $\cos A\cos B\cos C.$ 6M

UNIT-III

5 **a** Evaluate $\int_0^{\pi}\int_0^{a\sin\theta} r\,dr\,d\theta.$ 5M

b Evaluate the integral by changing the order of integration $\int_0^a \int_{x/a}^{\sqrt{x/a}} (x^2+y^2)dxdy$ 7M

OR

6 **a** Evaluate $\int_0^1\int_0^x e^{x/y}dx\,dy.$ 5M

b Change the order of integration and hence evaluate $\int_0^a \int_{\sqrt{ax}}^a \frac{y^2dx\,dy}{\sqrt{y^4-a^2x^2}}.$ 7M

UNIT-IV

7 **a** Find the Laplace transform of $f(t) = t\sin 3t.\cos 2t.$ 6M

b Show that $\int_0^{\infty} t^2e^{-4t}.\sin 2t\,dt = \frac{11}{500}$, using Laplace transform. 6M

OR

8 **a** Find Laplace Transform of $f(t) = |t-1| + |t+1|, t \geq 0.$ 6M

b Find the Laplace transform of $f(t) = [t]$, where [ ] stands for the greatest integer function. 6M

UNIT-V

9 **a** Find $L^{-1}\left\{\frac{1}{2}\log\left(\frac{s^2+b^2}{s^2+a^2}\right)\right\}.$ 6M

b Find $L^{-1}\left\{\frac{1}{(s^2+5^2)^2}\right\}$, using Convolution theorem. 6M

OR

10 Use transform method to solve $y''' + 2y'' - y' - 2y = 0, y(0) = y'(0) = 0, y''(0) = 6.$ 12M

*** END ***