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

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

SIDDHARTH INSTITUTE OF ENGINEERING & TECHNOLOGY:: PUTTUR

(AUTONOMOUS)

B.Tech I Year I Semester (R16) Supplementary Examinations December 2018

ENGINEERING MATHEMATICS - I

(Common to all)

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

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

UNIT-I

1 **a.** Solve $xy\left(1+xy^2\right)\frac{dy}{dx}=1.$ 6M

b. Find the orthogonal trajectories of the family of $r=2a(\cos\theta+\sin\theta).$ 6M

OR

2 **a.** Solve $(D^2-4D)y=e^x+\sin 3x\cos 2x.$ 5M

b. Solve $(D^2+a^2)y=\tan ax$ by method of variation of parameters 7M

UNIT-II

3 **a.** S.T. $\log(1+e^x)=\log 2+\frac{x}{2}+\frac{x^2}{8}-\frac{x^4}{192}+.....$ 6M

b. Find the minimum value of $x^2+y^2+z^2$ given $x+y+z=3a$. 6M

OR

4 **a.** Using Maclaurin's series expand $e^x\log(1+y)$ up to the terms of third degree. 6M

b. Show that the rectangular solid of maximum volume that can be inscribed in a sphere is a cube. 6M

UNIT-III

5 **a.** Evaluate $\int_0^{\pi/2}\int_0^{a\sin\theta}\int_0^{\frac{a-r^2}{a}} r\,dz\,dr\,d\theta$. 5M

b. Evaluate the integral by changing the order of integration $\int_0^{4a}\int_{x^2/4a}^{\sqrt[2]{ax}} dydx$ 7M

OR

6 **a.** Evaluate $\int_0^1\int_0^{\sqrt{1+x^2}}\frac{dy\,dx}{1+x^2+y^2}$. 5M

b. Change the order of integration and hence evaluate $\int_0^1\int_x^{\sqrt{2-x^2}}\frac{xdy\,dx}{\sqrt{x^2+y^2}}$. 7M

UNIT-IV

7 **a.** Find the Laplace transforms of $\left(\sqrt{t}+\frac{1}{\sqrt{t}}\right)^3$. 6M

b. Using Laplace transform, evaluate $\int_0^\infty\frac{\cos at-\cos bt}{t}dt$. 6M

OR

8

a. Find the Laplace transform of $f(t)=\begin{cases}\frac{t}{\tau}, 0<t<\tau \\ 1, t>\tau\end{cases}$. 6M

b. Find the Laplace transform of $f(t)=\begin{cases}1, 0<t<1 \\ t, 1<t<2. \\ 0, t>2\end{cases}$ 6M

UNIT-V

9 **a.** Find the Inverse Laplace transform of $\frac{5s-2}{s^2(s+2)(s-1)}$. 6M

b. Using Convolution theorem, find $L^{-1}\left\{\frac{s}{\left(s^2+a^2\right)^2}\right\}$. 6M

OR

10 Use transform method to solve $y'''+2y''+y=\sin t, y(0)=y'(0)=y''(0)=0.$ 12M

***** END *****