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

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

SIDDHARTH INSTITUTE OF ENGINEERING & TECHNOLOGY:: PUTTUR

(AUTONOMOUS)

B. Tech I Year I Semester Supplementary Examinations Feb-2021

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** A body kept in air with temperature 25° C cools from 140° C to 80° C in 20 min. Find when the body cools down to 35° C. **6 M**

b Solve $\left(D^2+a^2\right)y=\sec ax$ by the method of variation of parameters. **6 M**

OR

2 **a** Find the orthogonal trajectories of the family of the parabolas $y^2=4ax$. **6 M**

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

UNIT-II

3 **a** If $u=\frac{yz}{x}$, $v=\frac{zx}{y}$, $w=\frac{xy}{z}$ then show that $\frac{\partial(u,v,w)}{\partial(x,y,z)}=4$. **6 M**

b Find the radius of curvature at any point on the curve $y=c\cosh\left(\frac{x}{c}\right)$ **6 M**

OR

4 **a** Show that $\log\left(1+e^x\right)=\log 2+\frac{x}{2}+\frac{x^2}{8}-\frac{x^4}{192}+.....$ **7 M**

b Find a shortest and longest distance from the point $(1,2,-1)$ to the sphere $x^2+y^2+z^2=24$. **5 M**

UNIT-III

5 **a** Evaluate $\iint\left(x^2+y^2\right)dx\,dy$ over the positive quadrant for which $x+y\le 1$. **6 M**

b Evaluate the integral by changing to polar coordinates $\int_0^\infty\int_0^\infty e^{-\left(x^2+y^2\right)}dx\,dy$. **6 M**

OR

6 **a** Evaluate the integral $\int_0^\pi\int_0^{a\sin\theta} r\,dr\,d\theta$. **6 M**

b Evaluate the integral by changing the order of integration $\int_0^{4a}\int_{x^2/4a}^{\sqrt{4ax}} dy\,dx$ **6 M**

UNIT-IV

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

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

OR

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

b Find the Laplace transform of $f(t)=\frac{1-\cos at}{t}$ **6 M**

UNIT-V

9 a Evaluate $L^{-1}\left[\frac{5s-2}{s^2(s+2)(s-1)}\right]$ **6 M**

b Evaluate $L^{-1}\left[\frac{s}{(s^2+a^2)^2}\right]$ by using Convolution theorem. **6 M**

OR

10 Using Laplace Transform method solve $(D^2+n^2)x=a\sin(nt+\alpha)$ when $x=Dx=0$ at $t=0$ **12 M**

*** END ***