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

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

SIDDHARTH INSTITUTE OF ENGINEERING & TECHNOLOGY:: PUTTUR

(AUTONOMOUS)

B.Tech I Year I Semester (R16) Regular & Supplementary Examinations Dec 2017

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 $\left(1+e^{x/y}\right)dx+e^{x/y}\left(1-x/y\right)dy=0.$ 5M

b. Solve $3x\left(1-x^2\right)y^2\frac{dy}{dx}+\left(2x^2-1\right)y^3=ax^3.$ 7M

OR

2 a. A body is originally at 80^oC cools down to 60^oC in 20 min. If the temperature of the air is 40^oC, find the temperature of the body after 40 min.? 5M

b. Solve $\left(D^2+4\right)y=\tan 2x$ by method of variation of parameters. 7M

UNIT-II

3 a. Using Maclaurin's series expand $\tan x$ up to the fifth power of x. 7M

b. Show that $\sin^{-1}x=x+\frac{x^3}{3!}+\frac{1^2.3^2}{5!}x^5+\frac{1^2.3^2.5^2}{7!}x^7+\ldots$. 5M

OR

4 a. Find the minimum value of $x^2+y^2+z^2$ given $xyz=a^3.$ 5M

b. Find the radius of curvature of the Folium $x^3+y^3=3axy$ at $\left(3a/2,3a/2\right).$ 7M

UNIT-III

5 a. Evaluate $\int_0^1\int_x^{\sqrt{x}}(x^2+y^2)dxdy.$ 6M

b. Evaluate $\int_0^{\frac{\pi}{2}}\int_0^{a\sin\theta}\int_0^{\frac{a^2-r^2}{2}}rdz\,dr\,d\theta.$ 6M

OR

6 Change the order of integration in $I=\int_0^1\int_x^{\sqrt{2-x^2}}\frac{x}{\sqrt{\left(x^2+y^2\right)}}dydx$ and hence evaluate it. 12M

UNIT-IV

7	a.	Find the Laplace transforms of $\frac{\cos\sqrt{t}}{\sqrt{t}}$.	7M
	b.	Find the Laplace transform of $\sin 2t \cos 3t$.	5M

OR

8	a.	Using Laplace transform, evaluate $\int_0^\infty \frac{\cos 6t - \cos 4t}{t} dt$.	6M
	b.	Find the Laplace transform of the function $t^2 e^{-3t} \sin 2t$.	6M

UNIT-V

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

OR

10	a.	State and Prove Convolution theorem.	6M
	b.	Evaluate $L^{-1}\left\{\frac{1}{s^3(s^2+1)}\right\}$ by using Convolution theorem.	6M

***** END *****