Reg. No:

SIDDHARTH INSTITUTE OF ENGINEERING & TECHNOLOGY:: PUTTUR
(AUTONOMOUS)
B.Tech I Year I Semester Supplementary Examinations December-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　Solve $x\dfrac{dy}{dx} + y = \log x$.　　6M

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

OR

2　Solve $(D^3 + 2D^2 + D)y = e^{2x} + x + \sin 2x$.　　12M

UNIT-II

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

　　b　Show that $\log(1 + e^x) = \log 2 + \dfrac{x}{2} + \dfrac{x^2}{8} - \dfrac{x^4}{192} + \ldots$　　6M

OR

4　Find the minimum value of $x^2 + y^2 + z^2$ given that $x + y + z = 3a$.　　12M

UNIT-III

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

　　b　Evaluate $\displaystyle\int_0^1 \int_y^1 \int_0^{1-x} x\,dz\,dx\,dy$.　　6M

OR

6　Evaluate the integral by changing the order of integration $\displaystyle\int_0^{4a} \int_{x^2/4a}^{2\sqrt{ax}} dy\,dx$.　　12M

UNIT-IV

7　a　Find the Laplace transform of 3cos3t.cos 4t.　　6M

　　b　State and prove first shifting theorem.　　6M

OR

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

　　b　Find $L\{F(t)\}$, where F(t) is a periodic function of period 2a and it is given by　　6M

　　　$F(t) = \begin{cases} k, & o < t < a \\ -k & a < t < 2a \end{cases}$

UNIT-V

9　a　Find $L^{-1}\left\{\dfrac{3s-2}{s^2 - 4s + 20}\right\}$ by using first shifting theorem.　　6M

　　b　Using the Convolution Theorem, find $L^{-1}\left\{\dfrac{1}{(s^2 + 5^2)^2}\right\}$　　6M

OR

10　Use transform method, solve $y^{11} + 2y^1 + 5y = e^{-t} \sin t$ where $y(0) = 1, y^1(0) = 1$　　12M

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