Reg. No:

**SIDDHARTH INSTITUTE OF ENGINEERING & TECHNOLOGY:: PUTTUR**
(AUTONOMOUS)
**B.Tech II Year I Semester Supplementary Examinations Feb-2021**
**MATHEMATICS-III**
**(Electronics & Communication Engineering)**

Time: 3 hours                                                Max. Marks: 60

## PART-A
(Answer all the Questions **5 x 2 = 10** Marks)

1  a  Write the formula to find a cube root of a number by Newton Raphson's method.    **2M**
   b  Write the standard five-point formula.    **2M**
   c  Find $L(e^{at}\cosh bt)$    **2M**
   d  Find the Fourier sine transform of $\dfrac{1}{x}$.    **2M**
   e  Find the particular integral of $4r + 12s + 9t = e^{3x-2y}$.    **2M**

## PART-B
(Answer all Five Units 5 x 10 = 50 Marks)

### UNIT-I

2  Find the root of the equation $xe^x = 2$ by using regula-falsi method.    **10M**

**OR**

3  a  Using Newton's forward interpolation formula and the given table of values    **5M**

| $x$ | 1.1 | 1.3 | 1.5 | 1.7 | 1.9 |
|------|------|------|------|------|------|
| $f(x)$ | 0.21 | 0.69 | 1.25 | 1.89 | 2.61 |

   Obtain the value of $f(x)$ when $x = 1.4$.
   b  Use Newton's backward interpolation formula to find $f(32)$ given $f(25)=0.2707$,    **5M**
   $f(30)=0.3027, f(35)=0.3386, f(40)=0.3794$.

### UNIT-II

4  Using Taylor's series method find an approximate value of $y$ at $x = 0.2$ for the D.E    **10M**
   $y' - 2y = 3e^x$, $y(0) = 0$. Compare the numerical solution obtained with exact solution.

**OR**

5  Using the R-K method of $4^{th}$ order find $y(0.1), y(0.2), y(0.3)$ given that    **10M**
   $\dfrac{dy}{dx} = 1 + xy, y(0) = 2$.

### UNIT-III

6  a  Find $L(e^{-3t}[2\cos 5t - 3\sin 5t])$    **5M**

   b  Find the Laplace transform of $f(t) = \displaystyle\int_0^t e^{-t}\cos t \ dt$.    **5M**

**OR**

7  Using Laplace transform method to solve $y'' - 3y' + 2y = 4t + e^{3t}$ where    **10M**
   $y(0) = 1, y'(0) = 1$.

**8** Find the Fourier sine and cosine transforms of $f(x) = \dfrac{e^{-ax}}{x}, a > 0.$ Hence show that          **10M**

$$\int_{0}^{\infty} \frac{e^{-ax} - e^{-ax}}{x} \sin sx \, dx = \tan^{-1}\left(\frac{s}{a}\right) - \tan^{-1}\left(\frac{s}{b}\right).$$

**OR**

**9** Find the inverse Fourier sine transform of $f(x)$ of $F_s(p) = \dfrac{p}{1+p^2}.$          **10M**

**10 a** Solve $x(y-z)p + y(z-x)q = z(x-y).$          **5M**

**b** Solve $x^2(y-z)p + y^2(z-x)q = z^2(x-y).$          **5M**

**OR**

**11** A tightly stretched string with fixed end points $x=0$ and $x=l$ is initially at rest in its          **10M**
equilibrium position. It is set vibrating by giving each point a velocity $kx(l-x)$. Find
the displacement of the string at any distance $x$ from one end at any time $t$.

***END***