

**Reg. No:**

--	--	--	--	--	--	--	--	--	--

**SIDDHARTH INSTITUTE OF ENGINEERING & TECHNOLOGY:: PUTTUR**  
(AUTONOMOUS)

**B.Tech II Year I Semester Supplementary Examinations December-2021**  
**ENGINEERING MATHEMATICS-III**

(Common to all branches)

Time: 3 hours

Max. Marks: 60

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

**UNIT-I**

- 1 a** Show that  $u = \frac{x}{x^2 + y^2}$  is harmonic **6M**
- b** Find the analytic function whose imaginary part is  $e^x(x \sin y + y \cos y)$  **6M**

**OR**

- 2** Calculate  $\int_C f(z) dz$  where  $f(z) = \pi \exp(\pi \bar{z})$  and  $C$  is the boundary of the square with vertices at the points  $0, 1, 1+i$  and  $i$ , where  $C$  being in the clockwise direction. **12M**

**UNIT-II**

- 3 a** Determine the poles of the function  $f(z) = \frac{z^2}{(z-1)^2(z+2)}$  and the residues at each pole. **6M**
- b** Find the residue of the function  $f(z) = \frac{1}{(z^2 + 4)^2}$  where  $C$  is  $|z-i|=2$  **6M**

**OR**

- 4** Evaluate  $\int_0^\pi \frac{1}{a+b \cos \theta} d\theta = \frac{\pi}{\sqrt{a^2 - b^2}}, a > b > 0$  **12M**

**UNIT-III**

- 5** Find the root of the equation  $x \log_{10}(x) = 1.2$  using False position method **12M**

**OR**

- 6** From the following table values of  $x$  and  $y = \tan x$ . Find the values of  $y$  when  $x = 0.12$  and  $x = 0.28$ . **12M**

x	0.10	0.15	0.20	0.25	0.30
y	0.1003	0.1511	0.2027	0.2553	0.3093

**UNIT-IV**

- 7** Fit a second degree polynomial to the following data by the method of **least squares** **12M**

x	0	1	2	3	4
y	1	1.8	1.3	2.5	6.3

**OR**

- 8** Dividing the range into 10 equal parts, find the value of  $\int_0^{\frac{\pi}{2}} \sin x dx$  using Simpson's  $\frac{1}{3}$ rd rule. **12M**

**UNIT-V**

9 Using R-K 4<sup>th</sup> order method for  $\frac{dy}{dx} = \frac{y^2 - x^2}{y^2 + x^2}$ ,  $y(0) = 1$ . Find  $y(0.2)$  and  $y(0.4)$  **12M**

**OR**

10 Tabulate  $y(0.1)$ ,  $y(0.2)$  and  $y(0.3)$  using the Taylor's series method given that  $y' = y^2 + x$  **12M**  
and  $y(0) = 1$

\*\*\* END \*\*\*