SIDDHARTH INSTITUTE OF ENGINEERING & TECHNOLOGY:: PUTTUR
(AUTONOMOUS)
B.Tech II Year I Semester Supplementary Examinations June–2024
MATHEMATICS-III
(Electronics and 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	CO1	L1	2M
	b	write the standard five-point formula.	CO2	L1	2M
	c	Find $L\{t^2 + 3t + 10\}$.	CO3	L2	2M
	d	Define the inverse fourier sine and cosine transforms.	CO4	L1	2M
	e	Solve $p(1+q) = qz$.	CO5	L2	2M

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

2	Find the root of the equation $xe^x = 2$, using Regula-falsi method.	CO1	L3	10M

OR

3	From the following table values of x and $y = \tan x$ interpolate values of y when $x = 0.12$ and $x = 0.28$.	CO1	L3	10M

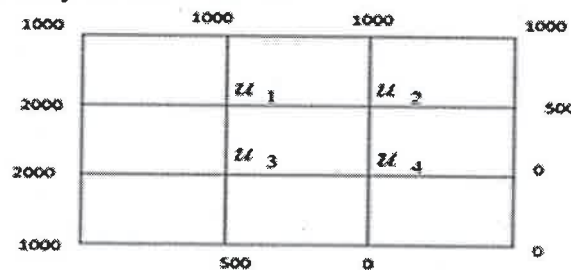| x	0.10	0.15	0.20	0.25	0.30
y	0.1003	0.1511	0.2027	0.2553	0.3093

UNIT-II

4	Using Taylor's series method find an approximate value of y at $x = 0.2$ for the D.E $y' - 2y = 3e^x$, $y(0) = 0$. Compare the numerical solution obtained with exact solution.	CO2	L3	10M

OR

5	Evaluate the function $u(x,y)$ satisfying $\nabla^2 u = 0$ at the pivotal points given the boundary values as follows:	CO2	L3	10M

UNIT-III

6	a	Show that $\int_0^\infty t^2 e^{-4t} \sin 2t \, dt = \dfrac{11}{500}$, Using Laplace transform.	CO3	L3	5M
	b	Find $L^{-1}\left\{\dfrac{1}{2}\log\left(\dfrac{s^2 + a^2}{s^2 + b^2}\right)\right\}$.	CO3	L1	5M

7 Solve the D.E $\dfrac{d^2x}{dt^2}+9x=\sin t$, using Laplace transform given that $x(0)=1,\ x\left(\dfrac{\pi}{2}\right)=1$.   CO3 L3 10M

UNIT-IV

8 a If $F(p)$ is the complex Fourier transform of $f(x)$, then prove that the complex Fourier transform of $f(x)\ \cos\ \alpha x$ is $\dfrac{1}{2}\big[F(p+a)+F(p-a)\big]$.   CO4 L2 5M

b Find the Fourier cosine transform of $e^{-ax}\cos ax,\ a>0$ CO4 L3 5M

OR

9 Find the Fourier sine and cosine transforms of $f(x)=\dfrac{e^{-ax}}{x}$ and deduce that $\int_0^\infty \dfrac{e^{-ax}-e^{-bx}}{x}\sin sx\,dx=\tan^{-1}\left(\dfrac{s}{a}\right)-\tan^{-1}\left(\dfrac{s}{b}\right)$.   CO4 L2 10M

UNIT-V

10 a Solve $x(y-z)p+y(z-x)q=z(x-y)$.   CO5 L3 5M
b Solve $x^2(y-z)p+y^2(z-x)q=z^2(x-y)$.   CO5 L3 5M

OR

11 A tightly stretched string of length l with fixed ends is initially in equilibrium position. It is set vibrating by giving each point a velocity $b\sin^3\left(\dfrac{\pi x}{l}\right)$. Find the displacement $y(x,\ t)$.   CO5 L3 10M

*** END ***