O.P.Code: 19HS0834	R19	H.T.No.									

SIDDHARTH INSTITUTE OF ENGINEERING & TECHNOLOGY:: PUTTUR
(AUTONOMOUS)
B.Tech II Year I Semester Supplementary Examinations June-2024
NUMERICAL METHODS AND TRANSFORMS
(Electronics and Communication Engineering)

Time: 3 Hours **Max. Marks: 60**

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

UNIT-I

1	Find a real root of the equation $xe^x - \cos x = 0$ using Newton – Raphson method.	**CO1**	**L2**	**12M**

OR

2	From the following table values of x and $y=\tan x$. Interpolate values of y when $x=0.12$ and $x=0.28$.	**CO1**	**L1**	**12M**

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

UNIT-II

3	a	Solve $y'=x+y$, given y (1)=0 find y(1.1) and y(1.2) by Taylor's series method.	**CO2**	**L3**	**6M**
	b	Solve by Euler's method $\frac{dy}{dx}=\frac{2y}{x}$ given y(1)=2 and find y(2) .	**CO2**	**L1**	**6M**

OR

4	a	Compute $\int_0^4 e^x dx$ by Simpson's $\frac{3}{8}$ rule with 12 sub divisions.	**CO2**	**L1**	**6M**
	b	Compute $\int_3^7 x^2 \log x dx$ using Trapezoidal rule and Simpson's $\frac{1}{3}$ rule by taking 10 sub divisions.	**CO2**	**L2**	**6M**

UNIT-III

5	a	Find the Laplace transform of $f(t)=\left(\sqrt{t}+\frac{1}{\sqrt{t}}\right)^3$.	**CO3**	**L2**	**6M**
	b	Find the Laplace transform of $f(t)=e^{4t}sin2t\,cost$.	**CO3**	**L3**	**6M**

OR

6	a	Find $L^{-1}\left\{\frac{1}{(s^2+5^2)^2}\right\}$, using Convolution theorem.	**CO3**	**L1**	**6M**
	b	Find $L^{-1}\left\{\frac{s^2}{(s^2+4)(s^2+25)}\right\}$, using Convolution theorem.	**CO3**	**L2**	**6M**

UNIT-IV

7	a	Obtain the Fourier series expansion of $f(x)=(\pi-x)^2$ in $0<x<2\pi$ and deduce that $\frac{1}{1^2}+\frac{1}{2^2}+\frac{1}{3^2}+\frac{1}{4^2}----=\frac{\pi^2}{6}$.	**CO4**	**L3**	**6M**
	b	Find the Fourier series for the function $f(x)=x$; in $-\pi < x < \pi$.	**CO4**	**L1**	**6M**

OR

8		Find half range Fourier cosine series of $f(x)=(x-1)^2$ in $0<x<1$. Hence show that $i)\ \frac{1}{1^2}+\frac{1}{2^2}+\frac{1}{3^2}+\frac{1}{4^2}----=\frac{\pi^2}{6}$ $ii)\ \sum_{n=1}^{\infty}\frac{(-1)^{n+1}}{n^2}=\frac{\pi^2}{12}$.	**CO4**	**L5**	**12M**

UNIT-V

9	a	Find the Fourier transform of $f(x) = e^{-\frac{x^2}{2}}, -\infty < x < \infty$.	CO5	L1	6M
	b	If F(p) is the complex Fourier transform of f(x), then prove that the complex Fourier transform of $f(x) = \cos ax$ is $\frac{1}{2}[F(p+a) + F(p-a)]$	CO5	L2	6M

OR

10		Find the finite Fourier sine and cosine transform of f(x) defined by $f(x) = 2x \text{ where } 0 < x < 2\pi$.	CO5	L3	12M

***** END *****