Q.P. Code: 19HS0834 **R19**

Reg. No: | | | | | | | | | | |

SIDDHARTH INSTITUTE OF ENGINEERING & TECHNOLOGY:: PUTTUR

(AUTONOMOUS)

B.Tech II Year I Semester Supplementary Examinations July-2022

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 $x\,e^{x}-\cos x=0$ using Newton – Raphson method. **L1** **12 M**

OR

2 **a** From the following table values of x and $y=\tan x$. Interpolate values of y when $x=0.12$. **L3** **6M**

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

b Using Newton's forward interpolation formula and the given table of values **L3** **6M**

x	1.1	1.3	1.5	1.7	1.9
y	0.21	0.69	1.25	1.89	2.61

Obtain the value of $f(x)$ when $x=1.4$

UNIT-II

3 Tabulate $y(0.1)$, $y(0.2)$ and $y(0.3)$ using Taylor's series method given that $y'=y^2+x$ and $y(0)=1$. **L4** **12M**

OR

4 Evaluate $\int_0^1 \frac{1}{1+x}dx$ **L5** **12M**

(i) by Trapezoidal rule and Simpson's 1/3 rule.

(ii) using Simpson's 3/8 rule and compare the result with actual value.

UNIT-III

5 **a** Evaluate $L\left[e^{4t}\sin 2t\cos t\right]$ **L5** **6M**

b Evaluate $L\left[f(t)\right]$, where $f(t)=t^2e^{2t}\sin 3t$ **L5** **6M**

OR

6 Using Laplace transform method, to solve $y''-3y'+2y=4t+3e^{3t}$ where $y(0)=1,\ y'(0)=1$. **L3** **12M**

UNIT-IV

7 **a** Find the half range cosine series for $f(x)=x$ in the interval $0\le x\le\pi$. **L1** **6M**

b Find a Fourier series to represent the function $f(x)=e^{x}$ for $-\pi\le x\le\pi$. **L1** **6M**

OR

8 Obtain half range Fourier cosine series of $f(x)=(x-1)^2$ in $[0,\ 1]$. **L2** **12M**

Hence show that $(i)\ \frac{\pi^2}{6}=\frac{1}{1^2}+\frac{1}{2^2}+\frac{1}{3^2}+\frac{1}{4^2}+-----$ $(ii)\ \sum_{n=1}^{\infty}\frac{(-1)^{n+1}}{n^2}=\frac{\pi^2}{12}$

UNIT-V

9 **a** Find the Fourier cosine transform of $f(x)$ defined by **L1** **6M**

$$f(x)=\begin{cases}\cos x, & 0<x<a\\ 0, & x\geq a\end{cases}.$$

b Prove that $F\left[x^n\ f(x)\right]=(-i)^n\frac{d^n}{d\,p^n}\left[F(p)\right]$ **L1** **6M**

OR

10 Find the finite Fourier sine and cosine transform of $f(x)$ defined by $f(x)=2x$, where $0<x<2\pi$. **L1** **12M**

*** END ***