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

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

SIDDHARTH INSTITUTE OF ENGINEERING & TECHNOLOGY:: PUTTUR

(AUTONOMOUS)

B. Tech II Year I Semester Supplementary Examinations December-2021

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 Using Newton-Raphson method (i) Find square root of 28 **L2** **12 M**

(ii) Find reciprocal of 15.

OR

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

x	0.10	0.15	0.20	0.25	0.30
y	0.0998	0.1494	0.1986	0.2474	0.2955

b) Use Newton's backward interpolation formula to find $f(32)$ given $f(25) = 0.2707$, $f(30) = 0.3027$, $f(35) = 0.3386$ and $f(40) = 0.3794$. **L1** **6M**

UNIT-II

3. Solve $y'' - x(y')^2 + y^2 = 0$ using R-K method of 4^{th} order for $x = 0.2$ given $y(0) = 1$ and $y'(0) = 0$ taking $h = 0.2$. **L1** **12M**

OR

4. **a)** Evaluate $\int_0^4 e^x \, dx$ by Simpson's rule with 12 sub divisions. **L5** **6M**

b) Evaluate $\int_3^7 x^2 \log x \, dx$ using Trapezoidal rule and Simpson's 3/8 rule by taking 10 sub divisions. **L5** **6M**

UNIT-III

5 **a)** Find the Laplace transform of $f(t) = \cosh at \sin bt$ **L1** **6M**

b) Find the Laplace transform of $f(t) = \int_0^t e^{-t} \cos t \, dt$. **L1** **6M**

OR

6. Solve the D.E. $y'' + 2y' + y = 3te^{-t}$ using Laplace Transform given that $y(0) = 4$, $y'(0) = 0$. **L3** **12M**

UNIT-IV

7. **a)** Obtain the Fourier series expansion of $f(x) = x^2$ in the interval $(0, 2\pi)$. **L2** **6M**

b) Obtain the Fourier series expansion of $f(x) = (x - x^2)$ in the interval $[-\pi, \pi]$. **L2** **6M**

OR

8. a) Expand $f(x)=e^{-x}$ as a Fourier series in the interval $(-1, 1)$. L2 6M

b) Find the half range cosine series expansion of $f(x)=x(2-x)$ in $0 \le x \le 2$. L1 6M

UNIT-V

9. a) Find the Fourier cosine transform of $f(x)=\begin{cases} x, & 0<x<1 \\ 2-x, & 1<x<2 \\ 0, & x>2 \end{cases}$ L1 6M

b) Prove that $F_s[xf(x)]=-\frac{d}{dp}[F_c(p)]$ L2 6M

OR

10. Find the Fourier transform of $f(x)=\begin{cases} a^2-x^2, & |x|<a \\ 0, & |x|>a>0 \end{cases}$ Hence show that $\int_0^\infty \frac{\sin x - x\cos x}{x^3}\,dx=\frac{\pi}{4}$. L1 12M

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