Course Code: 1940008 **Roll No:** MLRS- R19

MARRI LAXMAN REDDY
INSTITUTE OF TECHNOLOGY AND MANAGEMENT
(AN AUTONOMOUS INSTITUTION)
(Approved by AICTE, New Delhi & Affiliated to JNTUH, Hyderabad)
Accredited by NBA and NAAC with 'A' Grade & Recognized Under Section2(f) & 12(B)of the UGC act,1956

II B.Tech II Sem Regular End Examination, July 2021

Laplace Transforms, Numerical Methods and Complex Variables

(EEE & ECE)

Time: 3 Hours. **Max. Marks: 70**

Note: 1. Answer any FIVEquestions.
2. Each question carries 14 marks and may have a, b as sub questions.

1		Solve the differential equation using Laplace transforms $\frac{d^2x}{dt^2}+3\frac{dx}{dt}+2x=e^{-t};x(0)=0,x'(0)=1.$	14M	CO	BL
2	a)	State convolution theorem and evaluate $L^{-1}\left\{\frac{1}{(s^2+1)(s^2+9)}\right\}$ using convolution theorem.	7M	CO	BL
	b)	Find the Laplace transform of $f(t)=\lvert t-1\rvert+\lvert t+1\rvert, t\geq 0$.	7M	CO	BL
3		Using Lagrange formula express the function $\frac{x^2+6x-1}{(x^2-1)(x-4)(x-6)}$ as a sum of partial fractions.	14M	CO	BL
4	a)	Find up to the four places of decimals the smallest root of the equation $e^{-x}=\sin x$ using Newton-Raphson method.	7M	CO	BL
	b)	Evaluate $\int_0^{\pi/2} e^{sinx}dx$ taking $h=\pi/6$ using Trapezoidal rule.	7M	CO	BL
5		Using modified Euler's method, find an approximate value of y when x =1.2 in step size of 0.1, given that $\frac{dy}{dx}+\frac{y}{x}=\frac{1}{x^2}, y(1)=1$.	14M	CO	BL
6	a)	If $f(z)=u+iv$ is an analytic function in a region R, prove that the curves $u(x,y)=c_1$, $v(x,y)=c_2$ form two orthogonal families.	7M	CO	BL
	b)	Find the real and imaginary parts of $tanhz$.	7M	CO	BL
7	a)	Find the analytic function whose real part is xy.	7M	CO	BL
	b)	State Maximum-Modulus theorem. Find the kind of singularity for the function $\frac{1}{\sin z-\cos z}$.	7M	CO	BL
8	a)	If 0<|z-1|<2 then express $f(z)=\frac{z}{(z-1)(z-3)}$ in a series of positive and negative powers of (z-1).	7M	CO	BL
	b)	Evaluate $\oint_c \frac{dz}{z^2+6iz}$ where c is the circle $\lvert z\rvert=1$ by using Cauchy's Residue theorem.	7M	CO	BL

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