Code: 20BS1404

II B.Tech - II Semester – Regular / Supplementary Examinations MAY - 2023

TRANSFORM TECHNIQUES, NUMERICAL METHODS AND NUMBER THEORY (INFORMATION TECHNOLOGY)

Duration: 3 hours

Max. Marks: 70

Note: 1. This paper contains questions from 5 units of Syllabus. Each unit carries 14 marks and have an internal choice of Questions.

2. All parts of Question must be answered in one place.

BL – Blooms Level

CO – Course Outcome

			BL	СО	Max. Marks				
		UNIT-I							
1	a)	Estimate the Laplace transform of the			7 M				
		function $f(t) = t - 1 + t + 1 ; t \ge 0.$	L2	CO1					
	b)	Calculate the Laplace Transform of $e^{-t}(sin2t - 2tcos2t)$	L3	CO2	7 M				
		OR							
2	a)	Discover the Laplace Transform of $t sin^2 3t$.	L3	CO2	7 M				
	b)	Manipulate the Laplace transform of $\frac{1-cost}{t^2}$.	L3	CO2	7 M				
UNIT-II									
3	a)	Calculate $L^{-1}\left[\frac{s+1}{s^2+s+1}\right]$	L3	CO2	7 M				

OR4a)Calculate $L^{-1} \left[cot^{-1} \left(\frac{s}{2} \right) \right]$ L3CO27 Mb)Solve $\frac{d^2x}{dt^2} + 9x = cos2t$ if $x(0) = 1, x \left(\frac{\pi}{2} \right) = -1$ by Laplace transformL3CO27 MUNIT-III5a)Apply Bisection method to find a real root of the equation $x^3 - x - 11 = 0$.L3CO37 Mb)The population of a town in the decimal census was given below. Appraise the population for the year 1895.L4CO47 MVery equation of the second of the equation $x^3 - x - 11 = 0$.L4CO47 MORORORORORORORORORORORORCO3a)Discover a real root of the equation $2x - log_e x = 7$ by regula-falsi method correct to four decimal places.L3CO3		b)	Discover L^{-1}	$\left[\frac{1}{(s^2+a)}\right]$	s^2 $s^2(s^2+b)$	$\frac{1}{p^2}$ by	using		L3	CO2	7 M
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			f(x) 22	30	82	1	06	206			

UNIT-IV									
7		ing Taylor's series method find y at = 1.1 and 1.2 by solving $\frac{dy}{dx} = x^2 + y^2$ given	L3	CO3	14 M				
	y(1	1) = 2.3							
		OR	•						
8	app	ing modified Euler's method calculate an proximate value of y corresponding to $x = 0.3$	L3	CO3	14 M				
	giv	y = x + y, y(0) = 1.							
	I	UNIT-V		11					
9	a)	Estimate gcd (1769,2378) using division algorithm.	L2	CO1	7 M				
	b)	Identify the least positive residue of 3 ²⁰¹ modulo 11.	L2	CO1	7 M				
OR									
10	a)	Using Fermat's little theorem, describe the solutions of the linear congruence $7x \equiv 12 \mod 7$.	L2	CO1	7 M				
	b)	$x \equiv 1 \mod 0 3$ $x \equiv 2 \mod 0 5$ $x \equiv 3 \mod 0 7$	L2	CO1	7 M				
		by Chinese remainder theorem.							