Total number of printed pages:

UG/3rd Semester/UECE304

2024

NETWORK THEORY

Full Marks : 100

Time : Three hours

The figures in the margin indicate full marks for the questions. he margin man. Answer any five questions.

		Central Institute Of Technology	
1.	a)	Define the terms: Branch and node. Explain the steps involved in applying:	2+4+4=10
		(i) nodal analysis method, and (ii) mesh analysis method for analyzing the	
		circuits.	
	b)	Determine the loop currents of the circuit shown in Figure 1. Also find the	10
	0)	current through the 2 abm resistor	10
		current through the 2 onth resistor.	
		3.0	
		Smith - E	
		$6A(1)$ $> 2\Omega$ $> 6\Omega$ $> 2\Omega$	
		1 1 1 1 2 3	
		EST Figure-1006	
		ES 11501021000	
2	a)	What is the condition for maximum power transfer to the load? State	1+3+6=10
		reciprocity theorem. Find the current through the 10 Ω resistor in Figure 2	
		using Norton's theorem.	
		5 Ω	
		102	
		$\begin{cases} \geq 10 \Omega \\ \uparrow 4 A \geq 15 \Omega \end{cases}$	
		21	
		Figure-2	
	b)	State and prove Thevenin's theorem.	5
	c)	Define poles and zeros of a transfer function. For the given transfer	5
		function find the poles and zeros and also draw the pole zero plot $I(s) =$	



		network.	
	c)	Determine the trigonometric form of Fourier series of the following waveform : $x(t)$ T T/2 -T/4 T/2 T t	7
6.	a)	The circuit shown in the Figure-6 consists of resistance, capacitance and inductance in series with a 100V source when the switch is closed at $t = 0$. Find the equation obtained from the circuit in terms of current.	7
	b)	Write a short note on passive filter network.	6
	c)	The bandwidth of a series resonant circuit is 600 Hz. If the resonant frequency is 8000 Hz, what is the Q-factor? If $R = 20 \Omega$, what is the value of the inductive reactance at resonance? Calculate the inductance and capacitance of the circuit.	7
		असतो मा सत गमय तमसो मा ज्योतिर्गमय	