VEER SURENDRA SAI UNIVERSITY OF TECHNOLOGY (VSSUT), ODISHA

Odd Mid Semester Examination for Academic Session 2024-25

COURSE NAME: B.Tech. SEMESTER: 3rd

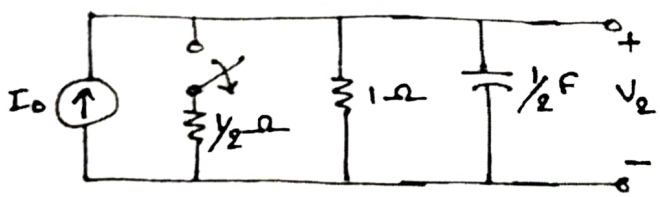
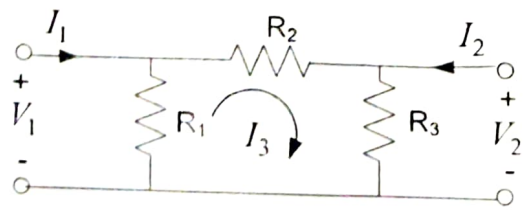
BRANCH NAME: Electrical and Electronics Engineering

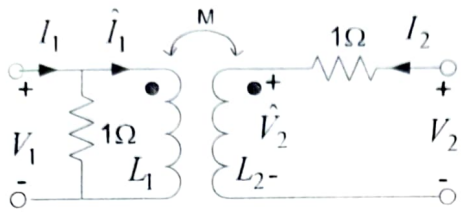
SUBJECT NAME: Network Theory

FULL MARKS: **30** TIME:**90 Minutes**

Answer **All**Questions.

The figures in the right hand margin indicate Marks. *Symbols carry usual meaning.*

Q1.		Answer all Questions.	**[2x3]**
	a)	When a complex matrix (electrical/electronic circuit) is analyzed for the multiple given/ known input(s) to find desired output/ responses, is also called "network analysis". Typically, this exercise is done by graph theory as the mathematical modeling-based analysis consumes longer time to reach the solutions. React over the statement?	- CO1
	b)	A Bridge-T network can be easily analyzed in terms of interconnected network using _____. State the reason of selecting a two port parameters.	- CO2
	c)	Mark any two necessary conditions to validate a system function.	- CO3
Q2.			**[8]**
		How inductance of a conductor relates to internal flux if a conductor is made of ferromagnetic material?	- CO1
		OR	
		As shown in Fig. 1. the switch is opened at time $t = 0$. Find the instantaneous voltage $v_2(t)$ for $t \geq 0$.	- CO1
		Fig. 1 	
Q3.			**[8]**
		Find the Z-parameters of the circuit shown in below, Fig. 2.	- CO1
		Fig. 2 	
		OR	

		Find the h-parameter of the circuit in Fig. 3, assuming $L_1 = L_2 = M = 1$-H. **Fig. 3**  	- CO2
Q4.			**[8]**
		Design an electrical equivalent circuit of the transfer function mentioned below, find the value of 'K' of the admittance function. $$Y(s) = \frac{K(s+1)}{(s+2)(s+4)}$$ Considering that series-arm impedance and shunt-arm impedance of the network are parallel tuning circuits. Where, the values of series –arm elements are $\mathbf{R_1}$ of 1.5-Ω resistance connected in parallel to a capacitor $\mathbf{C_1}$ 0.67-F while; the values of shunt–arm elements are $\mathbf{R_2}$ of 0.167-Ω resistance connected in parallel to a capacitor $\mathbf{C_2}$ of 2-F.	- CO3
		OR	
		An inductor **L** in series with a resistor **R** of 9-Ω resistance is connected in parallel to a capacitor **C**. The driving point impedance, Z(s) of the parallel combination has a zero at s = -3 and two poles at s = - $1.5 \pm \frac{j1}{2}\sqrt{111}$. Calculate the value of **L** and **C**? Also, plot the pole-zero locations on the s-plane.	- CO3