VIT

Reg. No. : 22BCI571

Final Assessment Test (FAT) - JUNE/JULY 2023

Programme	B.Tech.	Semester	Winter Semester 2022-23
Course Title	CIRCUIT THEORY	Course Code	BECE203L
Faculty Name	Prof. HEMAVATHY S	Slot	A1+TA1+TAA1
		Class Nbr	CH2022232300119
Time	3 Hours	Max. Marks	100

PART-A (5 X 8 Marks)
Answer All questions

01. Use mesh analysis to determine the three mesh current in the circuit of Fig.1. [8]

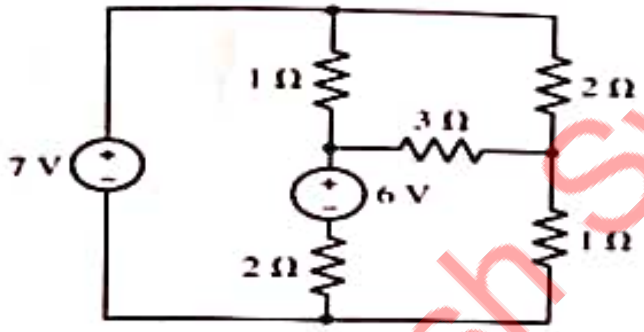


Fig.1

02. Find the Thevenin's equivalent circuit across 2Ω resistor for the network given in Fig.2. [8]

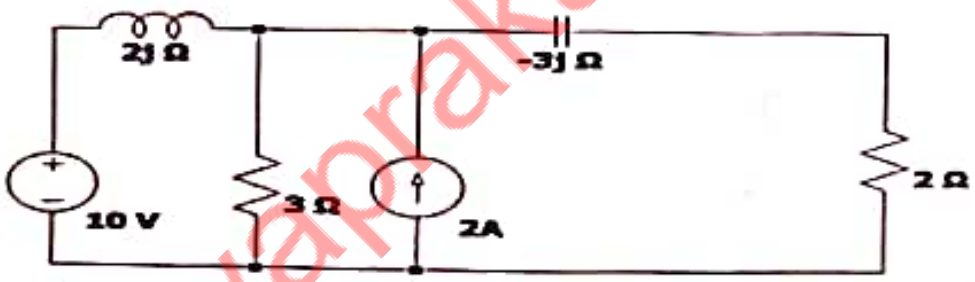


Fig.2

03. A series resonance circuit has R=1 kΩ, and half power frequencies of 10 kHz and 90 kHz. Determine the bandwidth, resonant frequency and Q factor of the circuit. Calculate the inductance and capacitance values of the circuit. [8]

04. Design an RL lowpass filter that uses a 20-mH coil and has a cutoff frequency of 5 kHz. How do you convert this filter into a High-pass filter? [8]

05. Design a T-type attenuator to attenuate 20 dB power for a line of 100 Ω characteristics impedance. [8]

PART-B (4 X 15 Marks)
Answer All questions

06. Draw the directed graph and determine [15]

(a) the nodal equations using equilibrium equations and calculate nodal voltages [10 Marks]
(b) branch voltages, and branch currents [5 Marks]
for the network shown in Fig.3 using a cut-set schedule. Consider the branches 2,3, and 4 as twig for the design of the tree.

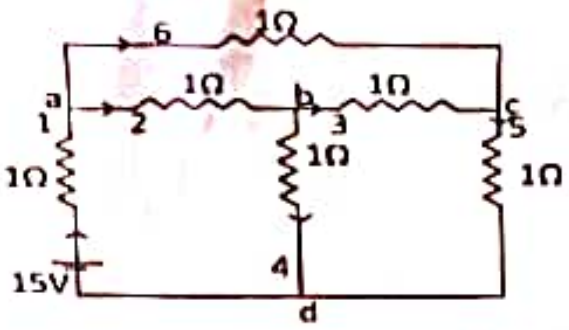


Fig.3

07. In the bridge circuit of Fig.4, $I_1 = 10$ A and $I_2 = -4$ A. **[15]**

(a) Find V_1 and V_2 using y - parameters. [10 Marks]

(b) Confirm the results in part (a) using z – parameters [5 Marks]

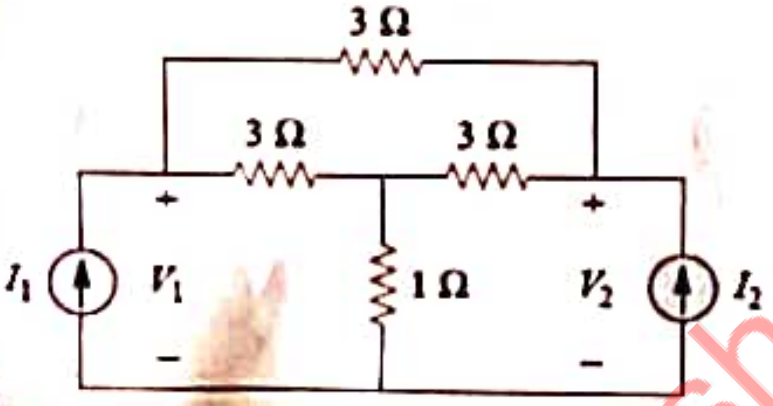


Fig.4

08. Calculate following values in the circuit of Fig.5 using Laplace transform. Assume $v_o(0)$=5V. **[15]**

(a) $v_o(t)$ **[10 Marks]**, (b) the current flow through the 5Ω and 10Ω resistors. **[5 Marks]**

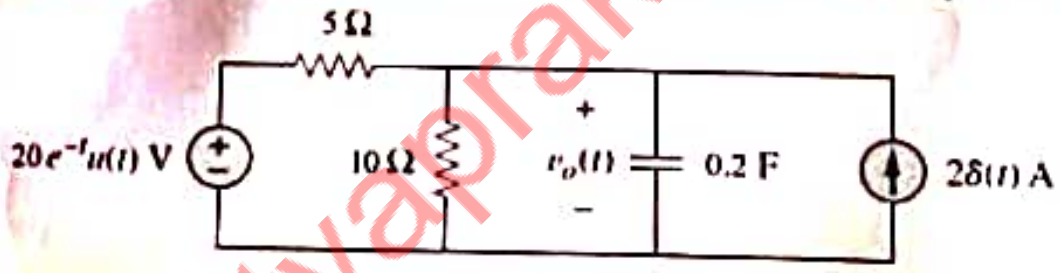


Fig.5

09. (a) Obtain the Fourier series for the periodic function shown in Fig.6. Discuss the evolution of the original function from its Fourier components. Discuss what is meant by the amplitude and phase spectra of the series. **[10 marks]** **[15]**

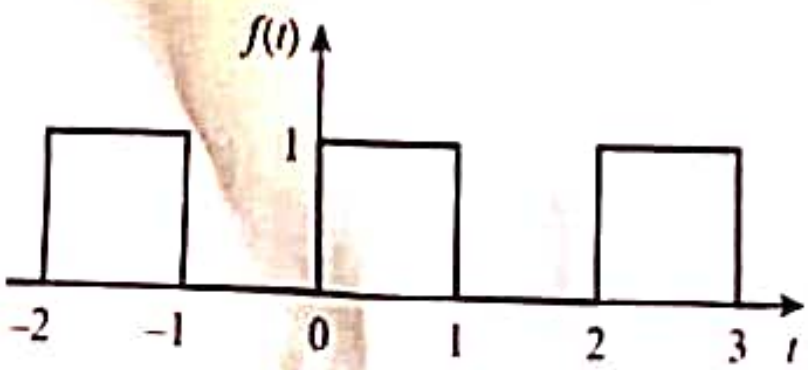


Fig 6

(b) Find $v_o(t)$ in the circuit of Fig.7 using Fourier transform, where $i_s = 5\,e^{-t}\,u(t)$ A. [5 marks]

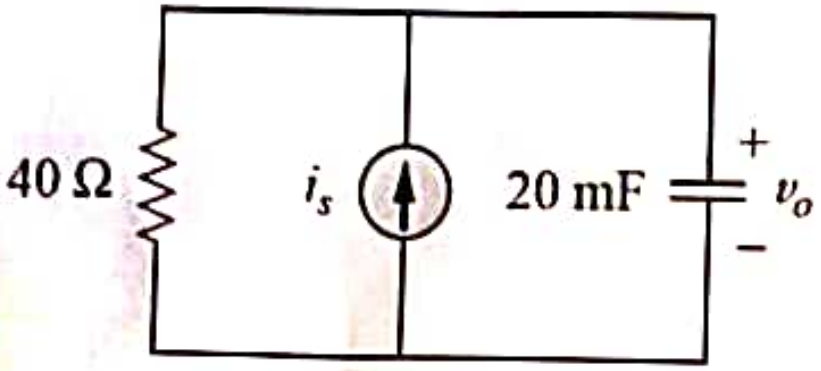


Fig.7

VIT

Reg. No. : 22BEE1096

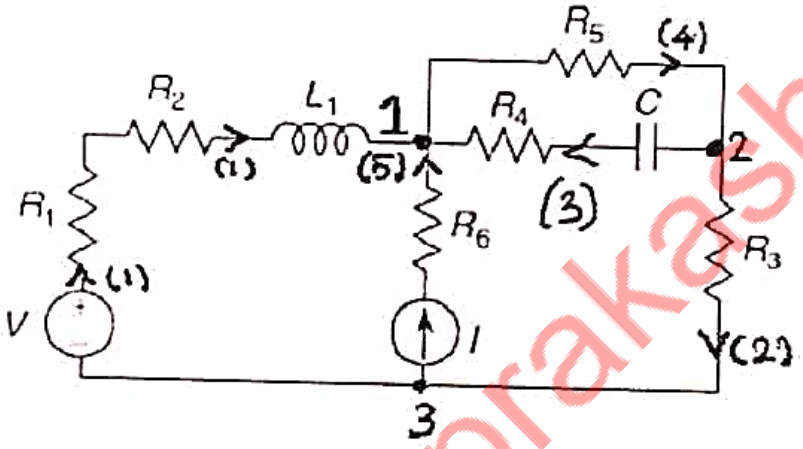
Final Assessment Test (FAT) - JUNE/JULY 2023

Programme	B.Tech.	Semester	Winter Semester 2022-23
Course Title	CIRCUIT THEORY	Course Code	BEEE203L
Faculty Name	Prof. Vaithilingam C	Slot	A2+TA2+TAA2
		Class Nbr	CH2022232300586
Time	3 Hours	Max. Marks	100

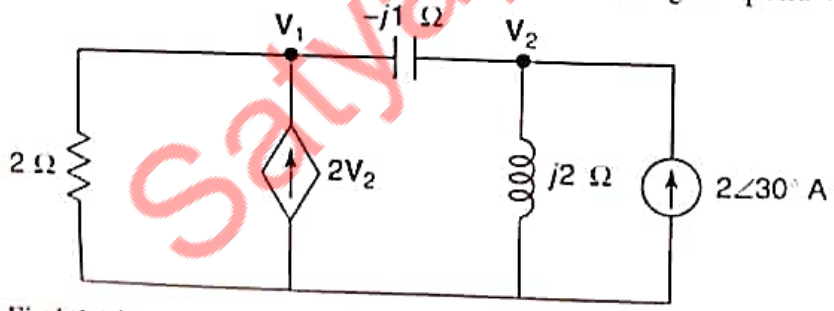
PART-A (10 X 10 Marks)

Answer All questions

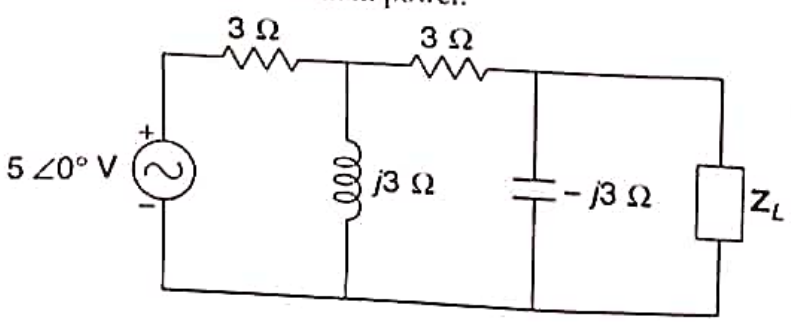
01. For the network shown in Figure, (a) draw the oriented graph and write the (b) incidence matrix. Draw a tree with branches (1) and (2) as twigs and write the (c) tieset matrix. and (d) f-cutset matrix. [10]



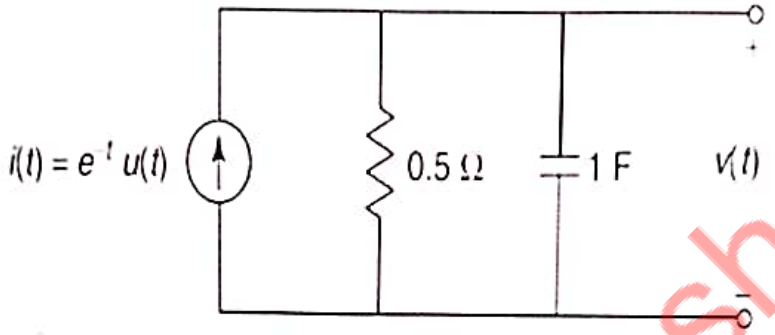
02. For the network shown in Figure, find the node voltages V_1 and V_2. [10]



03. Find the impedance Z_L so that maximum power can be transferred to it, in the network shown in Figure. Also find the maximum power. [10]



08. Find the output voltage response for the network shown in Figure, by applying Fourier transform. **[10]**



09. If v(t)= 10+6 cos (t+ 45°) +1.8 cos(2t-10°) volts and i (t) =3 + 1.4 cos (t+20°) + 0.5 cos 2t A. determine the effective value of the voltage and current. Also, calculate the average power. **[10]**

10. Find Y-parameters of the network shown in Figure. Also determine whether the network is symmetrical and reciprocal. **[10]**