


VIT[®]

 Vellore Institute of Technology
(Approved by the University Grants Commission, India)
Final Assessment Test – April 2026

Course: BAEE103 - Network Theory

Class NBR(s): 0796 / 0798 / 0800 / 0801 / 0803

Slot: A2+TA2+TAA2

Time: Three Hours

Max. Marks: 100

- KEEPING MOBILE PHONE/ANY ELECTRONIC GADGETS, EVEN IN 'OFF' POSITION IS TREATED AS EXAM MALPRACTICE
- DON'T WRITE ANYTHING ON THE QUESTION PAPER

COs	CO Statements
CO1	Compute DC circuit parameters using circuit laws and theorems
CO2	Determine the natural and step responses of RC, RL, and RLC circuits
CO3	Apply appropriate techniques and theorems for sinusoidal steady-state analysis
CO4	Apply the Laplace transform to circuits for steady-state and transient analysis
CO5	Compute two-port network parameters and network graph matrices for circuit analysis

BL – Blooms Taxonomy Level (1 – Remember, 2 – Understand, 3 – Apply, 4 – Analyse, 5 – Evaluate, 6 – Create)

Answer ALL Questions
 (10 X 10 = 100 Marks)

1. Use Mesh analysis to determine i_1 , i_2 , and i_3 in the circuit given in Figure 1.

CO1 BL3

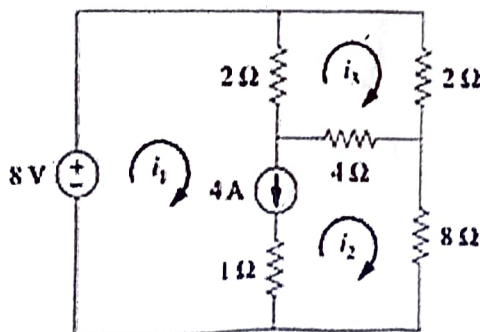


Figure 1

2. Find Thevenin and Norton equivalents at the terminals a-b of the circuit shown in Figure 2.

CO1 BL3

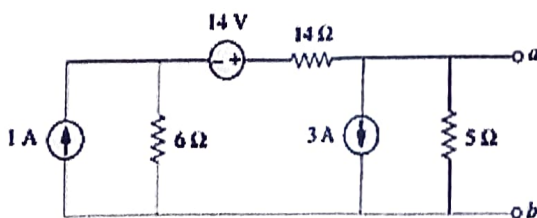


Figure 2

3. Find $i(t)$ in the circuit shown in Figure 3. For $t > 0$. Assume that the switch has been closed for a long time.

CO2 BL3

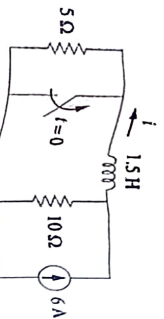


Figure 3

4. Determine $i(t)$ for all $t > 0$ in the RL circuit shown in Figure 4.

CO2 BL3

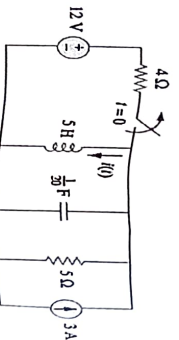


Figure 4

- 5.(a) Using nodal analysis method, calculate V_o for the circuit shown in Figure 5A.

CO3 BL3

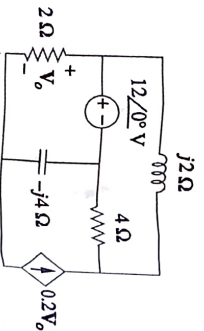


Figure 5A

OR

- 5.(b) Calculate the reactive power absorbed by the inductor and capacitor in the circuit of Figure 5B.

CO3 BL3

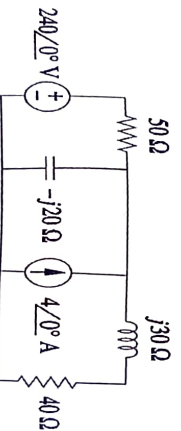


Figure 5B

6. Determine v_x for the circuit in Figure 6 using the superposition principle.

CO3 BL3

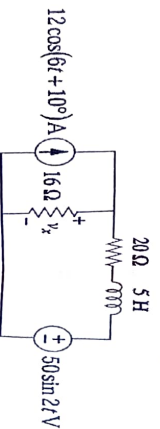


Figure 6

- 7.(a) Apply Laplace transform and obtain the transfer function $H(s) = V_o(s)/V_s(s)$ for the circuit of Figure 7A. Assume zero initial conditions.

CO4 BL3

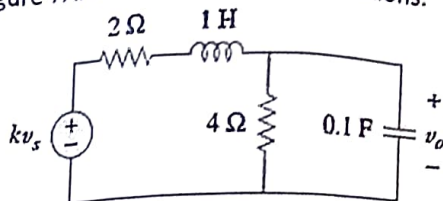


Figure 7A

OR

- 7.(b) Use the Fourier transform to find the $v_o(t)$ in the circuit shown in the Figure 7B. If $i_s(t) = 5e^{-t}u(t)$ A.

CO4 BL3

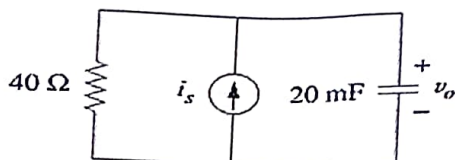


Figure 7B

8. Design a series RLC bandpass filter with cutoff frequencies of 10 kHz and 11 kHz. Assuming $C = 80$ pF, find R, L and Q.
9. Evaluate V_2/V_s in the circuit in Figure 8.

CO4 BL3

CO5 BL3

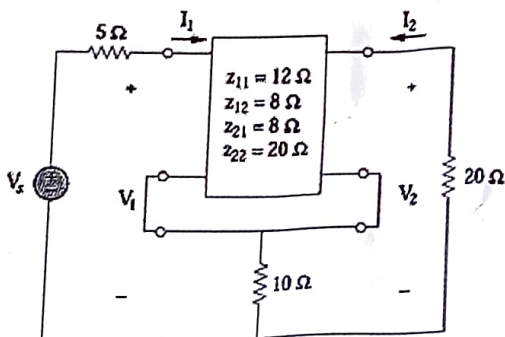


Figure 8

10. For a network graph shown in Figure 9, determine the number of possible trees. For a tree consisting of trees (1, 2, 3) (i) draw tie set matrix (ii) draw cut-set matrix.

CO5 BL3

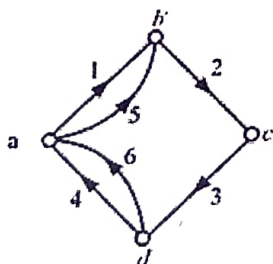


Figure 9

⇔⇔⇔ V/D/TZ ⇔⇔⇔