Department of Electrical and Electronics Engineering
Mar Athanasius College of Engineering, Kothamangalam
(Government Aided Autonomous Engineering College)

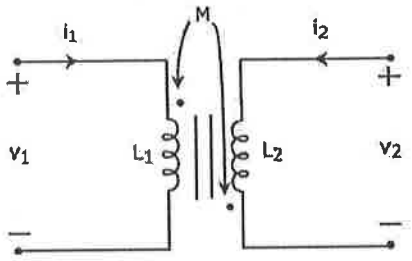
Second Sessional Examination -September 2026
B24EE2T01 Circuits and Networks- S3 EEE

Time: 1 hr. 30 min. Max Marks: 40

Part A [4x3 =12 marks]

1. A series RL circuit has R=5Ω, L=2H, and is excited by v(t)=10sin(4t). [CO3]
   Write the expression for current I(s), assuming zero initial inductor current.

2. Given L_1=2 H, L_2= 7 H, and the coefficient of coupling is 0.8. Write the equations for $v_1(t)$ and $v_2(t)$. [CO3]

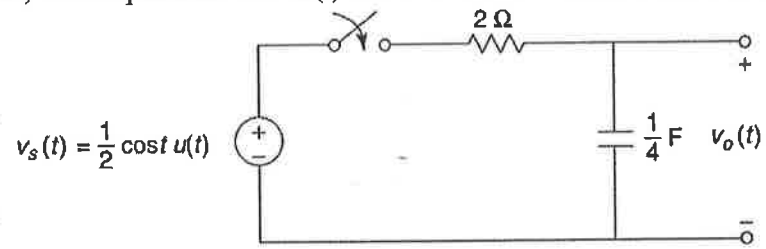


3. Plot the variation of current and impedance with frequency in a series RLC resonant circuit. [CO4]

4. A balanced three-phase, 400 V (line-line), three-wire supply feeds an unbalanced star-connected resistive load having impedances Z_R =10 Ω, Z_Y=20 Ω, and Z_B=30 Ω. Determine the three line currents. [CO4]

Part B [2x14 = 28 marks]

5. For the following network, find expression for $V_o(t)$ and obtain its numerical value at t=2 sec. [CO3]



6. a) For a series RLC circuit, derive the relationship between Q-factor and bandwidth. [CO4]
   b) A voltage v(t)=10sin(ωt) is applied to a series RLC circuit. At the resonant frequency of the circuit, the voltage across the capacitor is found to be 500 V. The bandwidth of the circuit is known to be 400 rad/sec, and the impedance of the circuit at resonance is 100 Ω. Determine inductance and capacitance, Q-factor, resonant frequency, upper and lower cut-off frequencies.

Students will be able to:
CO 3: Solve AC circuits and coupled circuits with sinusoidal excitation using Laplace transforms and s-domain analysis.
CO 4: Apply resonance in RLC circuits and solve unbalanced three-phase systems using appropriate methods

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Mould technically competent and morally strong Engineers
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