MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY

(Autonomous Institution – UGC, Govt. of India)

UG Model question paper-I

ELECTRICAL CIRCUIT ANALYSIS

EEEII YEARI SEMESER

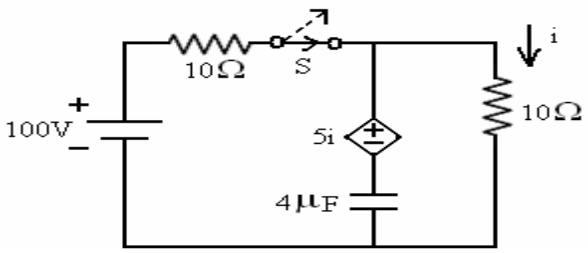
Time: 3 hours **Max Marks: 70**

Note: This question paper contains of 5 sections. Answer five questions, choosing onequestion from each section and each question carries 14 marks.

5*14=70M

SECTION-I

1. a) For the circuit shown below Figure, find the current equation when switch S is opened at t = 0. **[7M]**

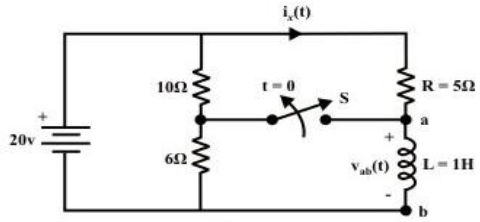


b) Explain the DC response of series R-C circuit with neat waveforms. **[7M]**

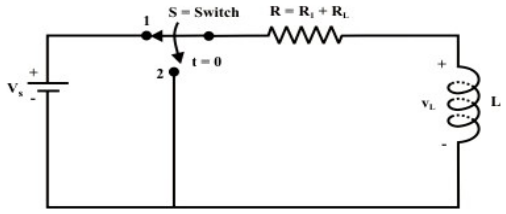
(OR)

2. a) In the given circuit the switch is opened at t=0.Find **[7M]**

(i) $V_{ab}(0-)$
(ii) $i_x(0-)$
(iii) $i_x(0+)$
(iv) $V_{ab}(0+)$
(v) $i_x(t=\infty)$
(vi) $i_x(t)$ for t>0.



b) In the given circuit the switch is shifted from position 1 to 2 at t=0.Determine i(t) for t>0.**[7M]**



SECTION-II

3. Explain the transient response in time domain with sinusoidal excitation as input for a RC circuit. Draw the voltage waveform across R and C.**[14M]**

(OR)

4. Explain the transient response in time domain with sinusoidal excitation as input for a RL circuit. Draw the voltage waveform across R and L.**[14M]**

SECTION-III

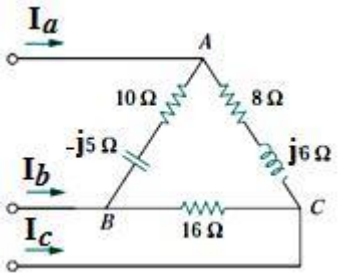
5. a) A balanced delta-connected load has a phase current $I_{AC}= 10\angle -30^0$ A:**[7M]**

i) Determine the three line currents assuming that the circuit operates in the positive phase sequence.

ii) Calculate the load impedance if the line voltage is $V_{AB}= 110\angle 0^0$ V.

b) A balanced star-connected load absorbs a total power of 5 KW at a leading power factor of 0.6 when connected to a line voltage of 240 V. Find the impedance of each phase and total complex power of load.**[7M]**

6.a)The unbalanced -load as shown in Figure 4 below is supplied by balanced voltages of 200V in the positive sequence. Find the line currents. Take $\mathbf{V}_{ab}$ as reference. **[7M]**



b) Prove that two watt-meters are sufficient to measure power in three phase system.**[7M]**

SECTION-IV

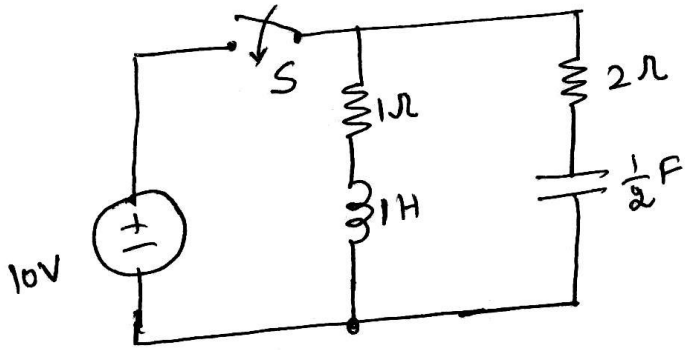
7. Explain about Series Resonance in detail along with quality factor and band width.**[14M]**

(OR)

8. Draw the locus diagram of series R-L circuit and R-C circuit when R is variable.**[14M]**

SECTION-V

9. For the network shown below figure, 'S' is switched on at t=0. Find the driving point impedance and source current in s-domain.**[14M]**



(OR)

10. a) List the necessary conditions for transfer functions.**[7M]**

b) Find the pole zero locations of the current transfer ratio I_2 / I_1 in s- domain for circuit **[7M]**

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UG Model question paper-II

ELECTRICAL CIRCUIT ANALYSIS

EEE II YEAR I SEMESER

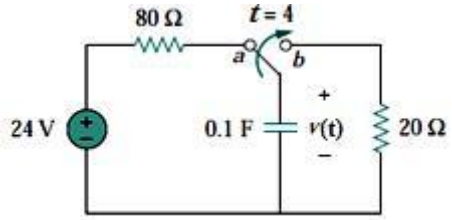
Time: 3 hours **Max Marks: 70**

Note: This question paper contains of 5 sections. Answer five questions, choosing onequestion from each section and each question carries 14 marks.

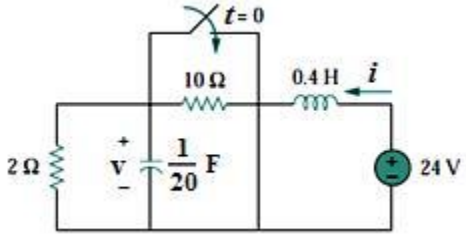
5*14=70M

SECTION-I

1. a) The switch in the figure has been in position *a* for a long time, At t = 4 s the switch is moved to position *b* and left there. Determine $v(t)$ at t = 10 s. **[7M]**

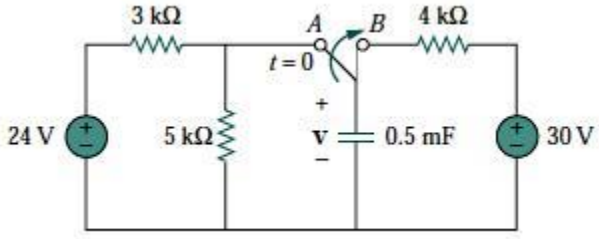


b) The switch in Figure was open for a long time but closed at t = 0. Determine:
(i) i(0+), v(0+),
(ii) (ii) i(∞), v(∞). **[7M]**

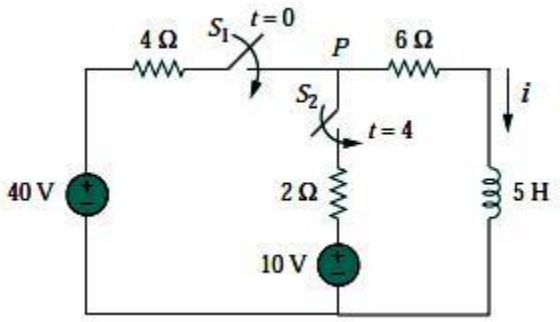


(OR)

2.a) The switch in figure has been in position A for a long time. At t = 0,the switch moves to B. Determine V(t) for t > 0 and calculate its value at t = 1 s and 4 s.**[7M]**



b) At t = 0, switch 1 in Figure 8 is closed, and switch 2 is closed 4 s later. Find i(t) for t > 0. Calculate i for t = 2 s and t = 5 s. **[7M]**



SECTION-II

3. Derive the expression for the current in a series RL circuit (R = 10Ω, L = 10 mH) excited by a sinusoidal voltage of 100V, 50 Hz if the supply is connected at t = 0. Assume zero initial conditions. **[14M]**

(OR)

4. Derive the expression for the voltage across the capacitor in a series RLC circuit (R = 5Ω, L = 5 mH, C = 5μF) excited by a sinusoidal voltage of 100V, 50 Hz if the supply is connected at t= 0. Assume zero initial conditions. **[14M]**

SECTION-III

5.a)Three impedances each of (10+j3) ohms are connected in star to a 220 V, 3-phase,50 Hz supply. Calculate the line currents and power delivered to the load.**[7M]**

b) Derive the relation between phase and line values of a 3-phase balanced delta connected system**.** **[7M]**

(OR)

6.a)Explain the measurement of power in a balanced 3-phase system using a single watt meter.**[7M]**

b) Three coils each having a resistance of 50 Ω and an inductive reactance of 45 Ω are connected in star and fed by a 3-phase, 400 V, 50 Hz system. Find

i) Line current

ii) Power

iii) Power factor **[7M]**

SECTION-IV

7.Explain about Parallel Resonance in detail along with quality factor and band width.**[14M]**

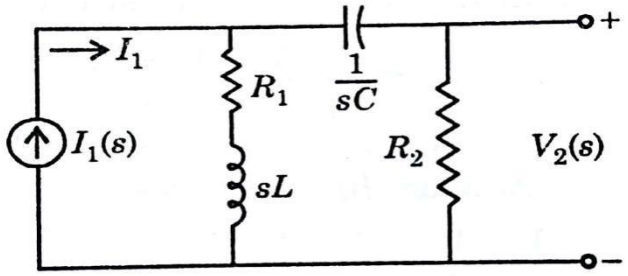
(OR)

8. Draw and explain about the locus diagram of parallel R-C circuit and R-L circuit when R is variable. **[14M]**

SECTION-V

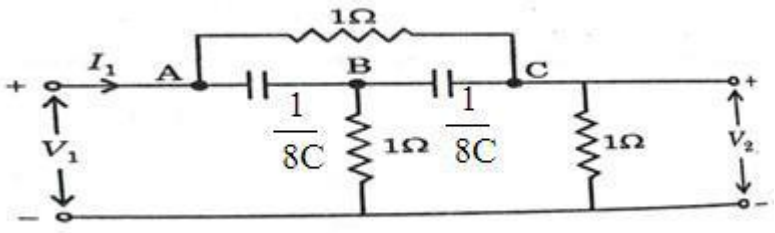
9. a) Explain the concept of Complex Frequency.**[7M]**

b) Find the Transfer Impedance function for the network given below.**[7M]**



(OR)

10) Find the Driving Point Impedance, Transfer Impedance and Voltage Transfer Function for the circuit given below. **[14M]**



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UG Model question paper-III

ELECTRICAL CIRCUIT ANALYSIS

EEE II YEAR I SEMESER

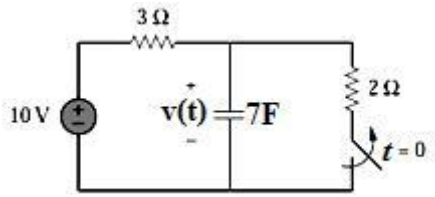
Time: 3 hours **Max Marks: 70**

Note: This question paper contains of 5 sections. Answer five questions, choosing onequestion from each section and each question carries 14 marks.

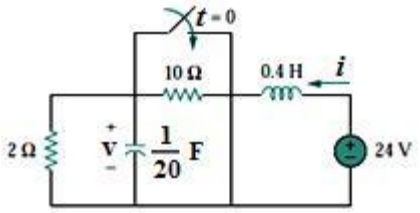
5*14=70M

SECTION-I

1 a) In the circuit shown figure, the capacitor voltage just before t = 0 is **[7M]**



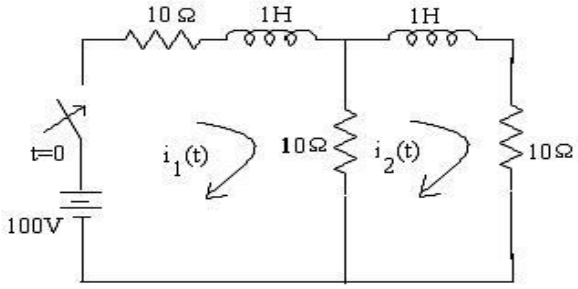
b) The switch in the figure 3 has been open for a long time. It is open at $t = 0$, the **[7M]** value of v(∞).



(OR)

2. a) Deduce the transient response of RL series circuit excited by DC source.**[7M]**

b) In the network shown in the figure below, the switch is closed at t = 0. Find the **[7M]** values of i1(t) and i2(t) assuming zero initial currents through inductors.



SECTION-II

3. What is damping ratio? Derive the time constant for a parallel RC circuit excited by AC supply. **[14M]**

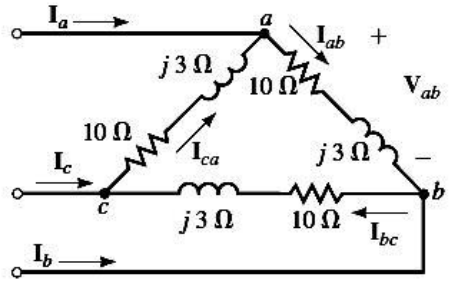
(OR)

4. What is the condition for the response of a series RLC circuit excited by DC supply to have critically damped response? **[14M]**

SECTION-III

5. a) Two watt meters connected to a 3- phase motor indicate the total power input to be 12 kW. The power factor is 0.6. Determine the readings of each wattmeter.**[7M]**

b) If $\mathbf{V}_{ab} = 240\ \text{V} \angle 15^0$ for the circuit shown figure 1 below, what is the value of I_{ab}. **[7M]**



(OR)

6. a) Explain about three phase system? List out the merits of three phase system.**[7M]**

b) Three coils, each having resistance of 25Ω and inductive reactance of 10Ω are connected in Star to a 400V, 3-phase, 50Hz AC supply. Calculate the power supplied.**[7M]**

SECTION-IV

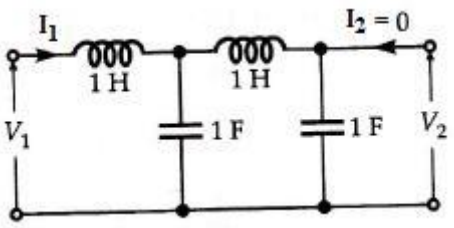
7. Explain about Series and Parallel Resonance in detail along with quality factor and bandwidth. **[14M]**

(OR)

8. Draw and explain about the locus diagram of Series R-C circuit and R-L circuit when X_L is variable. **[14M]**

SECTION-V

9. What is the driving point and transfer impedance of the network shown figure below?**[14M]**



(OR)

10. Find the expression for voltage transformation ratio for the network shown in figure **[14M]**