

III-SEM./ Electrical Engg./EEE/2021(W) OLD
EET301 Circuit and Network Theory

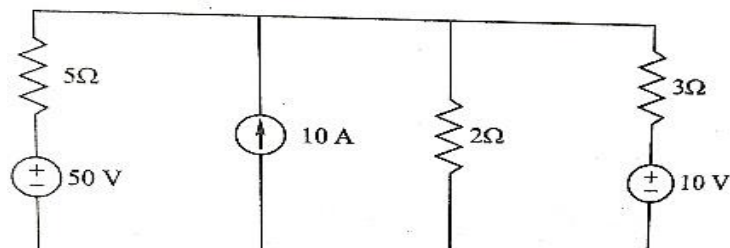
Full Marks: 80

Time- 3 Hrs

Answer any five Questions including Q No.1& 2
Figures in the right hand margin indicates marks

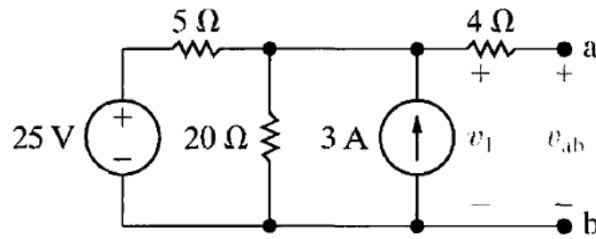
1. Answer **All** questions 2 x 10
- What are open-circuit impedance parameters?
 - Give an example of (i) Passive Element (ii) Bilateral Element
 - A current of 15 A divides between two branches in parallel resistance of 8 ohm & 16 ohm respectively. Calculate the current in each branch.
 - Draw impedance triangle of RL and RC series circuit.
 - Write down the analogous between electrical and magnetic circuit.
 - Define band pass filter and low pass filter.
 - What do you mean by self and mutual inductance.
 - Write down the relationship between line current and phase current in both star and delta connection.
 - What is the true power consumed in a 30V series RLC circuit if $Z= 20$ ohm and $R= 10$ ohm?
 - A series RC circuit has $|V_R| = 12$ V and $|V_C| = 5$ V. Calculate the magnitude of supply voltage.

2. Answer **Any Six** Questions 5X6
- A 230 V, 50 Hz ac supply is applied to a coil of 0.06 H inductance and 2.5Ω resistance connected in series with a $6.8 \mu\text{F}$ capacitor. Calculate (i) Impedance (ii) Current (iii) Phase angle between current and voltage (iv) power factor
 - Use nodal analysis method, find current through 5Ω resistor in the below circuit.

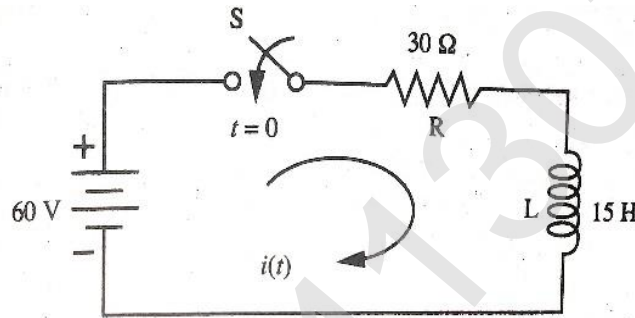


- Derive the bandwidth of RLC series resonance circuit.
- Write short notes on hysteresis loop.

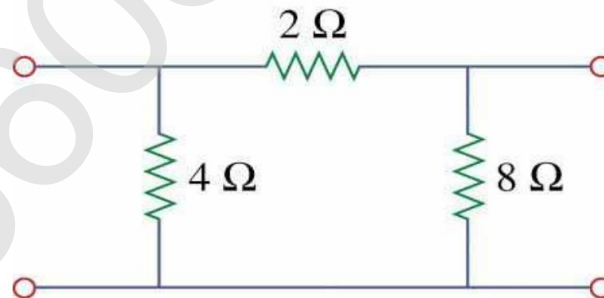
- e. Find R_{th} and V_{th} in the below circuit using Thevenin theorem.



- f. Explain dot conversion rules for coupled circuits.
- g. Derive the expression for the current in the below circuit when the switch, S is closed at $t=0$.



3. State Maximum Power Transfer theorem. Derive the condition of maximum power transfer. 10
4. Explain the concept of Super-mesh and Super-node with one suitable example for each. 10
5. Obtain the Y-parameter of below circuit. 10



6. A 3-phase balanced, star connected load of $(2+j4)$ ohm is connected to a 3-phase balanced delta connected source with a phase voltage of 220V. Determine line voltage, phase voltage across the load, line current and phase current in the load, assume RYB phase sequence. Also calculate the power drawn by the load. 10
7. An impedance $Z_L = (10+j10)$ ohm is connected in parallel with another impedance of resistance 8.5ohm and a variable capacitance connected in series. Find the capacitance such that circuit is in resonance at 5KHz. 10