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# B.M.S. College of Engineering, Bengaluru-560019

**Autonomous Institute Affiliated to VTU**

## May 2023 Semester End Main Examinations

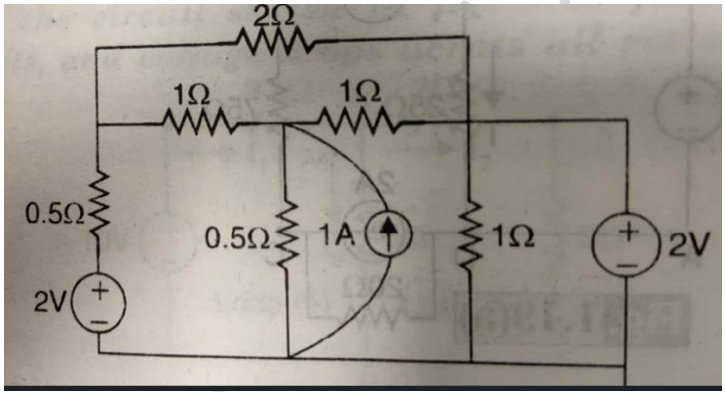
**Programme: B.E.** **Semester: III**
**Branch: ES Cluster (EEE/TCE/ECE/EIE/ML)** **Duration: 3 hrs.**
**Course Code: 15ES3GCLCA** **Max Marks: 100**
**Course: Linear Circuit Analysis** **Date: 19.05.2023**

**Instructions**: 1. Answer any FIVE full questions, choosing one full question from each unit.
2. Missing data, if any, may be suitably assumed.

**Important Note:** Completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages. Revealing of identification, appeal to evaluator will be treated as malpractice.

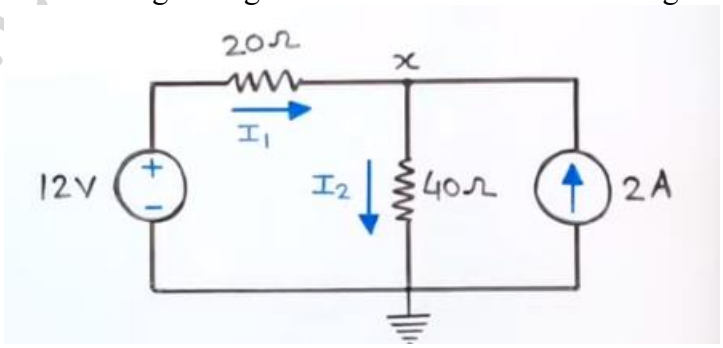
### UNIT - I

**1 a)** For the circuit shown below, determine all the branch currents. **08**



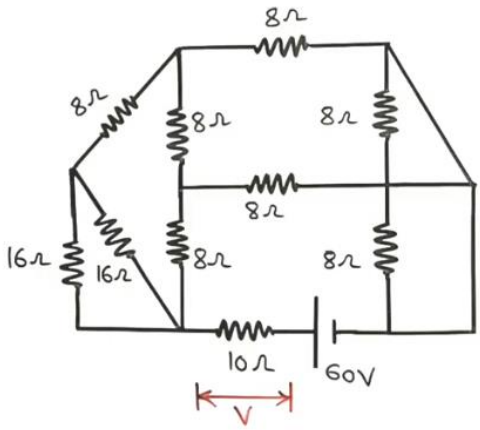

**b)** Three resistors R1=5Ω, R2=10Ω & R3=15Ω, are connected in series, and a 10-volt Voltage source is connected across them. Find the voltage drop across R2, using voltage division rule. **04**

**c)** Find the current flowing through 20Ω and 40 Ω resistance using KCL **08**

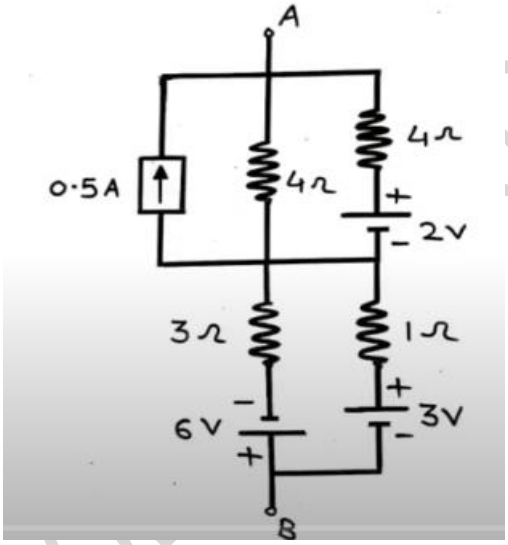



**OR**

**2 a)** Find the voltage drop across 10ohm resistance for the circuit shown below using stat-delta transformation **12**



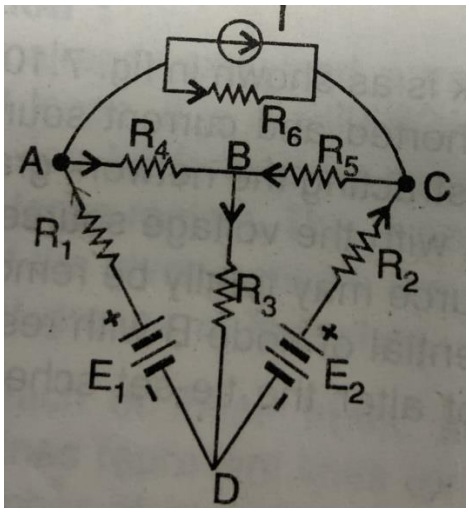

**b)** Reduce the network shown in fig. into a single current source in parallel with one of the elements. **08**




**UNIT - II**

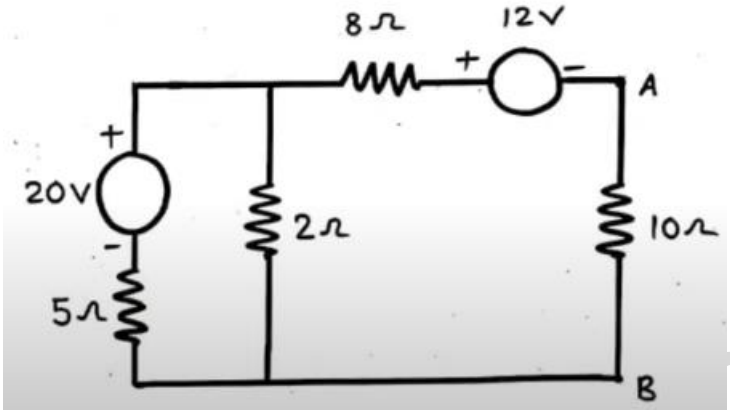
**3** **a)** A series connected RLC circuit has R= 15ohm, L= 40mH and C=40μF. Determine the resonant frequency, and under resonant condition, calculate the current, power, the voltage drops across various elements, if the applied voltage is 75 volts. **10**

**b)** For the network shown below, draw the graph, select a tree and write the tie-set schedule. **10**

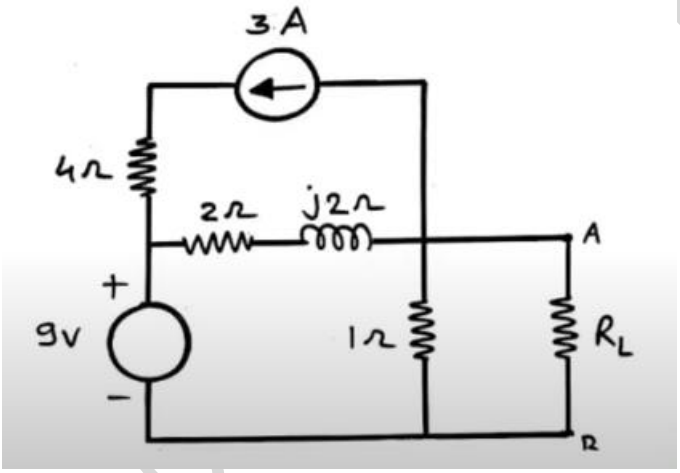


## UNIT - III

**4** **a)** Evaluate the current through 10-ohm resistor by Norton Theorem. **10**

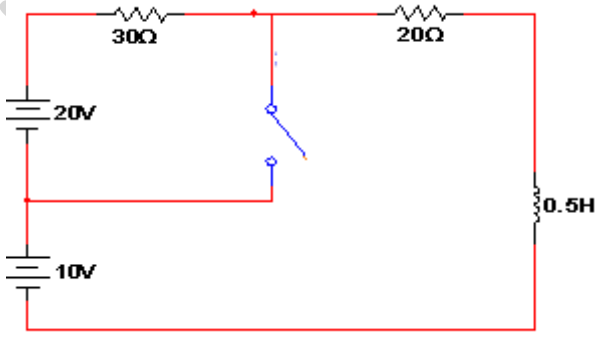



**b)** For the circuit shown below find the load resistance RL to have maximum power dissipated. Also find that maximum power. **10**

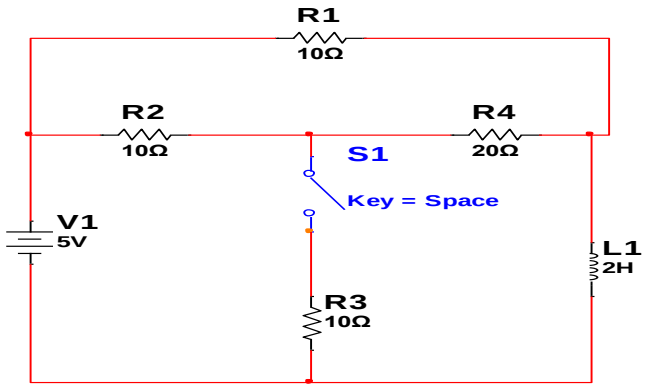



## UNIT - IV

**5** **a)** The network achieves a steady state with the switch closed. At t =0, switch is opened. Find i(t) for t > 0. **10**

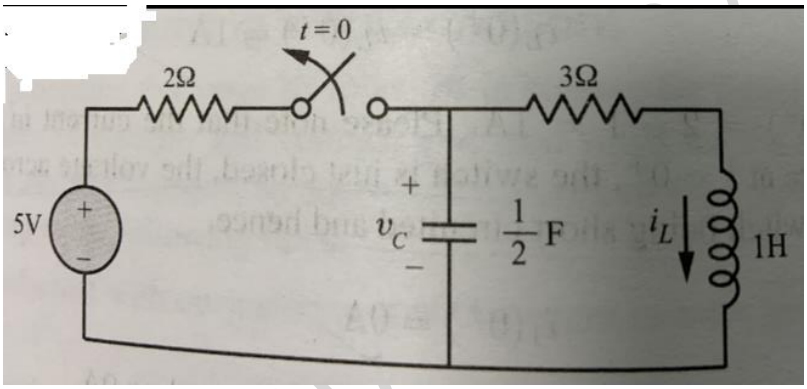



**b)** In the network steady state is reached with the switch K open. At t =0, switch is closed. Determine the values of $V_a(0^-)$ and $V_a(0^+)$ **10**

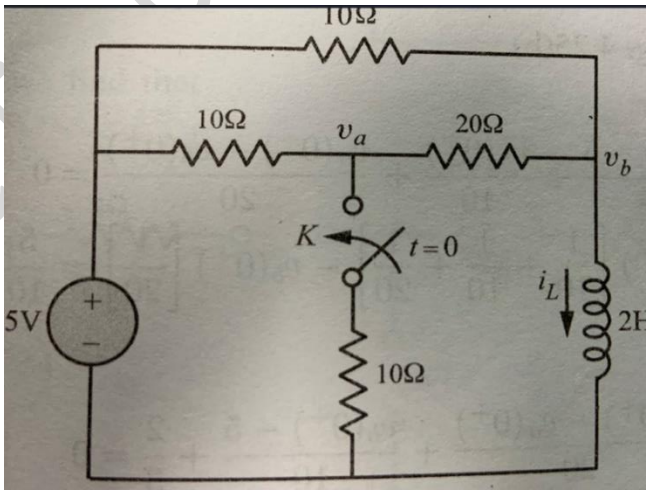



**OR**

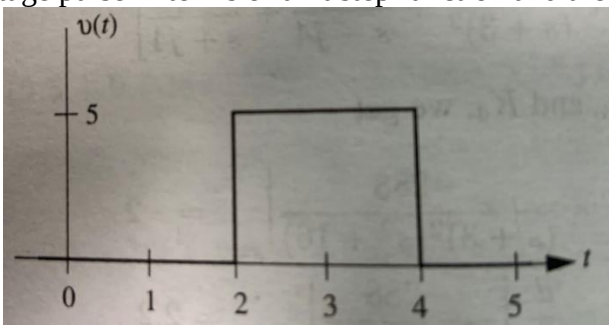
**6** **a)** In the circuit given, find $i_L(0+)$ and $v_C(0+)$. The circuit is in steady state with the switch in closed condition. **07**




**b)** In the circuit below, a steady state is reached with switch K open. At t=0, the switch is closed. For the element values given, determine the values of $v_a(0-)$ and Va(0+) **08**

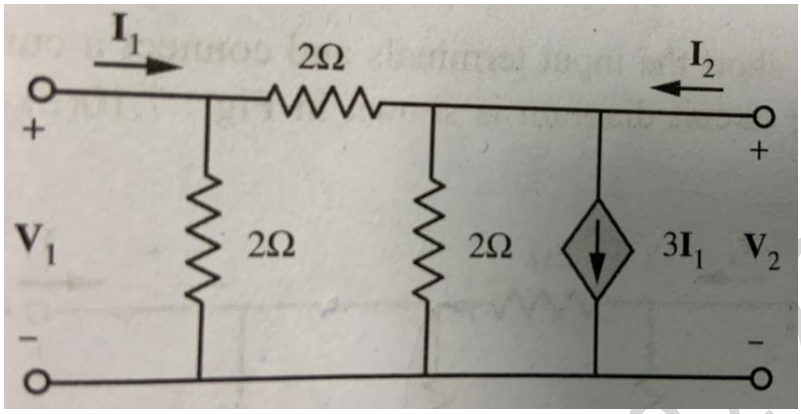



**c)** Express the voltage pulse in terms of unit step function and then find V(s). **05**



**UNIT – V**

7 **a)** For the network shown in the figure below containing a current- controlled current source. For this network, find the 'z' and 'y' parameters **10**




**b)** Determine the 'Y' parameters for a two-port network if the z parameters are $z = \begin{bmatrix} 10 & 5 \\ 5 & 9 \end{bmatrix}$ **05**

**c)** Following are the hybrid parameter for a network: **05**

$$\begin{bmatrix} h11 & h12 \\ h21 & h22 \end{bmatrix} = \begin{bmatrix} 5 & 2 \\ 3 & 6 \end{bmatrix}$$

Determine the 'y' parameters for the network.

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