Code No: RR10204 **RR** **Set No. 2**

I B.Tech Examinations,December 2010
NETWORK THEORY
Common to BME, IT, ICE, E.COMP.E, ETM, E.CONT.E, EIE, CSE, ECE, CSSE, EEE

Time: 3 hours **Max Marks: 80**

Answer any FIVE Questions
All Questions carry equal marks

⋆ ⋆ ⋆ ⋆ ⋆

1. (a) Find ABCD parameters for the following network shown in figure4a.

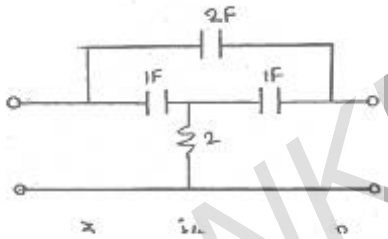

Figure 4a

(b) Show that the total energy stored in the series RLC circuit is a constant when a constant voltage at resonance frequency is applied: Define Q-factor in terms of this energy. [8+8]

2. (a) Explain the terms Graph, Tree, and a Cutset of a network with suitable example.

(b) For the network shown the figure6b, determine the value of the node voltages V_1& V_2. Determine the power dissipated in each of the resistors.

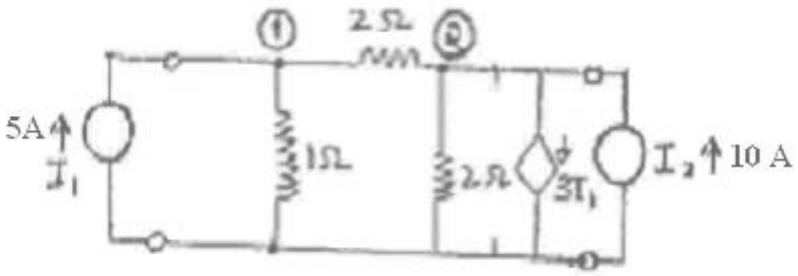

Figure 6b

(c) Obtain the expression for the propagation constant of symmetrical T-network. [4+8+4]

3. (a) Explain why the voltage across capacitor cannot change instantaneously?

(b) What is the significance of time constant for R-L circuit? What are the different ways of defining time constant?

(c) Switch t is close at t = 0. Find initial conditions for voltage across capacitor, i_1, i_2, $\frac{di_1}{dt}$ and $\frac{di_2}{dt}$. In the following network shown in figure2c. [2+4+10]

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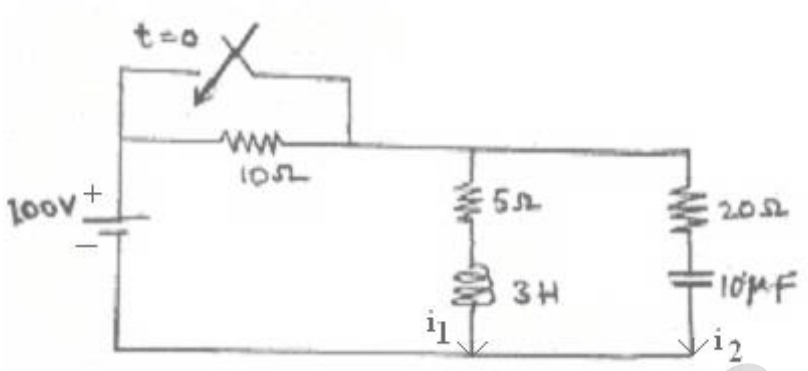

Figure 2c

4. (a) State and explain the superposition theorem.
   (b) Using super position theorem find the current in 2 ohms resistor from the following network shown in figure3b. [6+10]

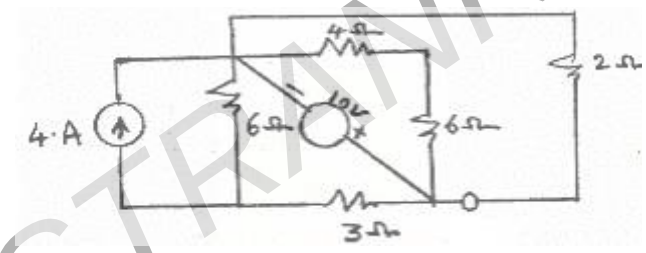

Figure 3b

5. (a) Get the expression for complex power and the sign of the active power.
   (b) Find I_1, I_2, I_3 and I Find also the power consumed for the network shown in figure 7b. Draw the phasor diagram. [4+12]

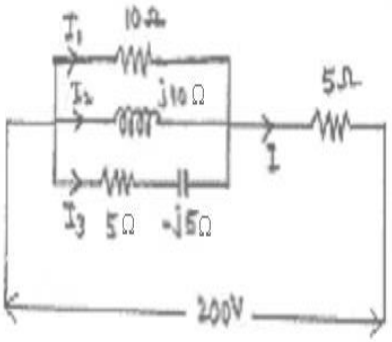

Figure 7b

6. (a) A 3phase 4000V system has a delta connected load with Z_{ab}=(8+j6)Ω Z_{bc}=(12+j16)Ω and Z_{ca}=(6-j8)Ω. Find the phase currents and line currents. Determine the power consumed by each load impedance. Draw the phasor diagram.
   (b) Three impedances are connected in figure 5b shown across a 400V, 50HZ, 3 phase supply. Find the readings of the watt meters. [10+6]

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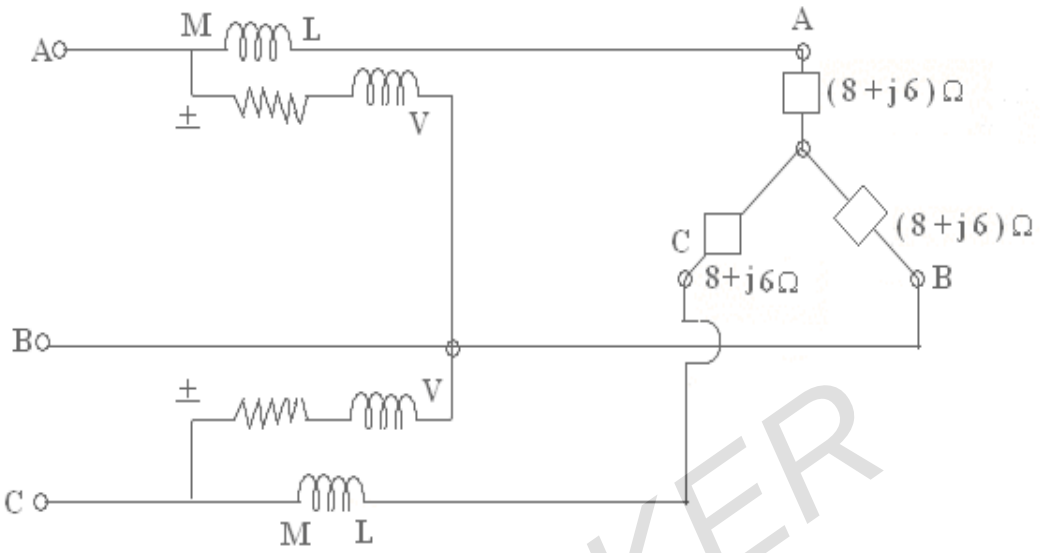

Figure 5b

7. (a) Write down the integro differential equations for the magnetically coupled circuit shown in figure1a. The mutual inductences between L_1 and L_2, L_2 and L_3, and L_3 and L_1 are respectively M_{12}, M_{23} and M_{13}.

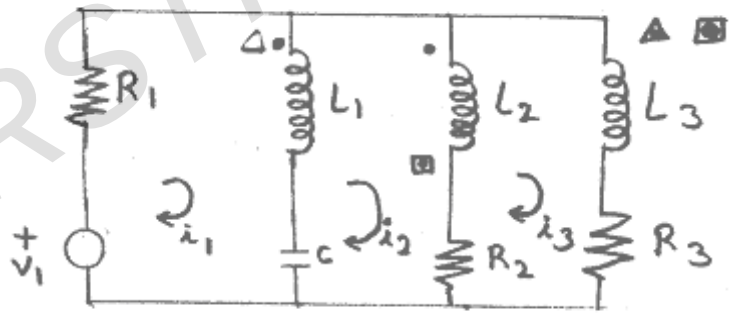

Figure 1a

(b) Derive the relation between the flux density B and magnetising force H. Also derive the expression for reluctance. [8+8]

8. (a) State and explain KCL and KVL

(b) Distinguish between

i. independent and dependent sources

ii. Ideal and practical sources.

(c) Find V_s if $r_1 = 2\ \Omega$ $r_2 = 1\ \Omega$ $r_3 = 5\ \Omega$ the following figure8c. [4+4+8]

Code No: RR10204 **RR** **Set No. 2**

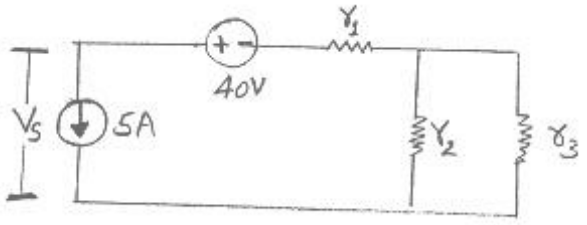

Figure 8c

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Code No: RR10204 **RR** **Set No. 4**

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Time: 3 hours **Max Marks: 80**

Answer any FIVE Questions
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1. (a) State and explain the superposition theorem.
   (b) Using super position theorem find the current in 2 ohms resistor from the following network shown in figure3b. [6+10]

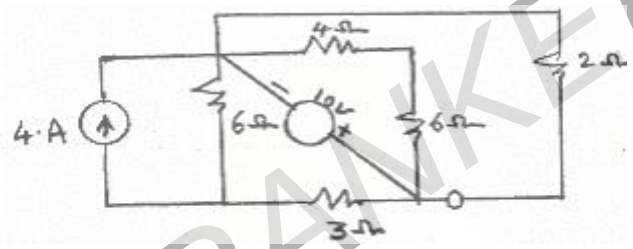

Figure 3b

2. (a) Write down the integro differential equations for the magnetically coupled circuit shown in figure1a. The mutual inductences between L_1 and L_2, L_2 and L_3, and L_3 and L_1 are respectively M_{12}, M_{23} and M_{13}.

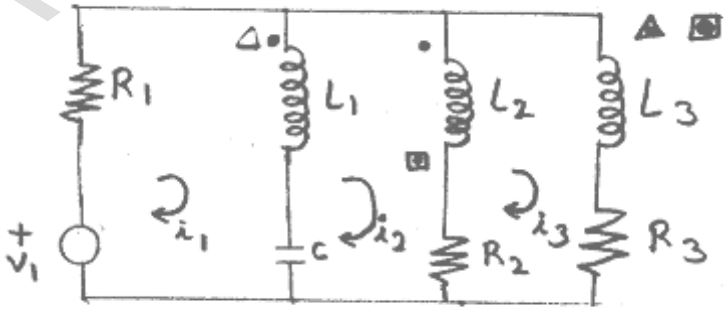

Figure 1a

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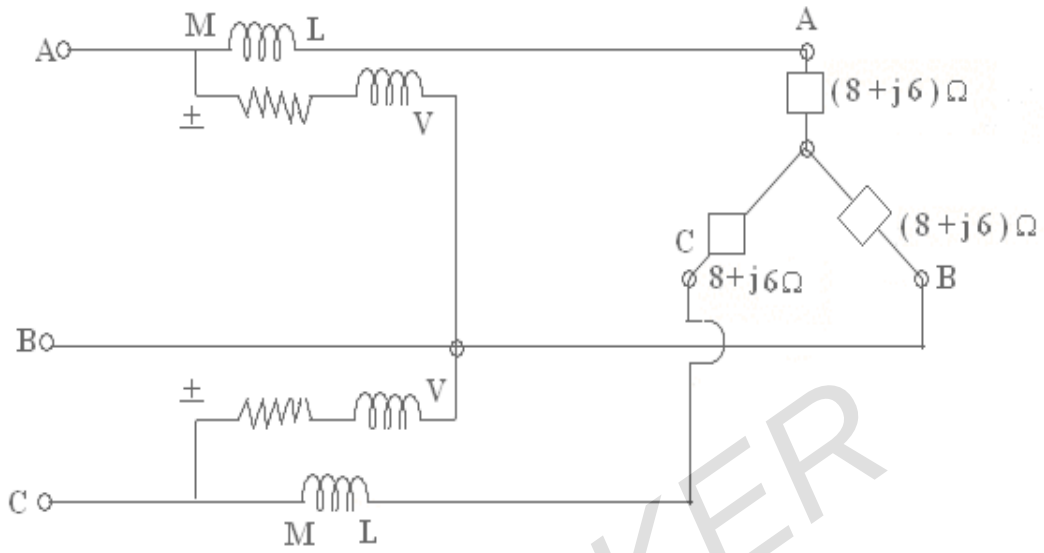
3. (a) A 3phase 4000V system has a delta connected load with Z_{ab}=(8+j6)Ω Z_{bc}=(12+j16)Ω and Z_{ca}=(6-j8)Ω. Find the phase currents and line currents. Determine the power consumed by each load impedance. Draw the phasor diagram.
   (b) Three impedances are connected in figure 5b shown across a 400V, 50HZ, 3 phase supply. Find the readings of the watt meters. [10+6]

Code No: RR10204 **RR** **Set No. 4**



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4. (a) Explain the terms Graph, Tree, and a Cutset of a network with suitable example.

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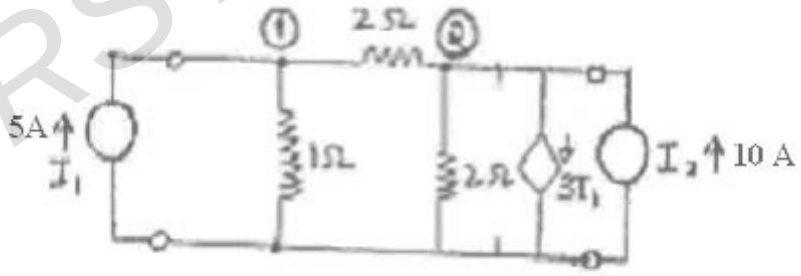

Figure 6b

   (c) Obtain the expression for the propagation constant of symmetrical T-network. [4+8+4]

5. (a) State and explain KCL and KVL

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Code No: RR10204 **RR** **Set No. 4**

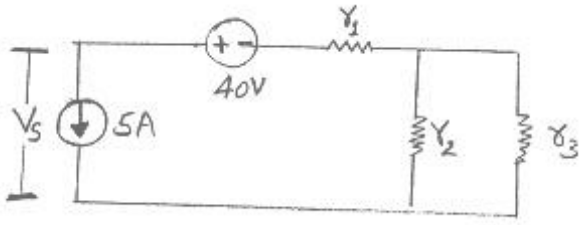

Figure 8c

6. (a) Find ABCD parameters for the following network shown in figure4a.

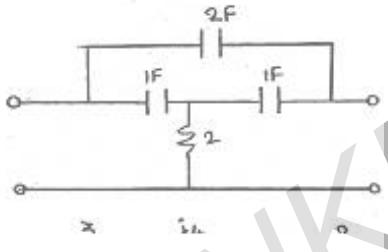

Figure 4a

(b) Show that the total energy stored in the series RLC circuit is a constant when a constant voltage at resonance frequency is applied: Define Q-factor in terms of this energy. [8+8]

7. (a) Get the expression for complex power and the sign of the active power.

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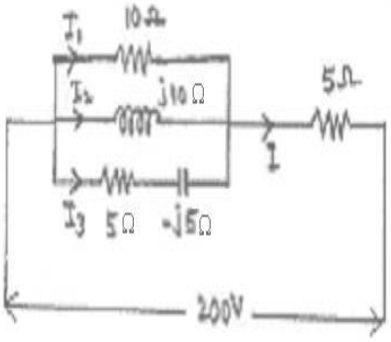

Figure 7b

8. (a) Explain why the voltage across capacitor cannot change instantaneously?

(b) What is the significance of time constant for R-L circuit? What are the different ways of defining time constant?

(c) Switch t is close at t = 0. Find initial conditions for voltage across capacitor, i_1, i_2, $\frac{di_1}{dt}$ and $\frac{di_2}{dt}$. In the following network shown in figure2c. [2+4+10]

Code No: RR10204 **RR** **Set No. 4**

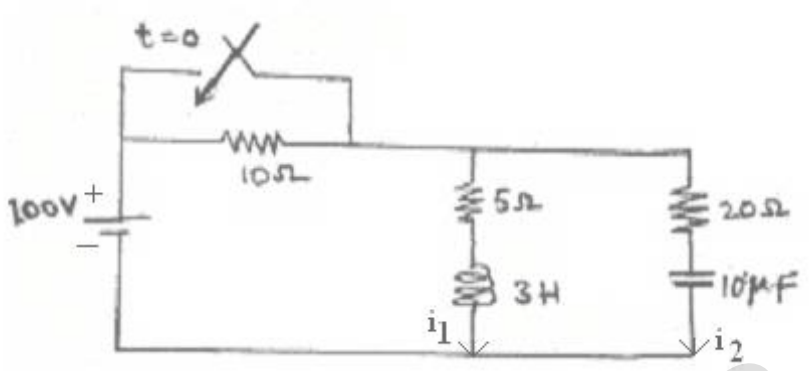

Figure 2c

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Code No: RR10204 **RR** **Set No. 1**

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Time: 3 hours **Max Marks: 80**

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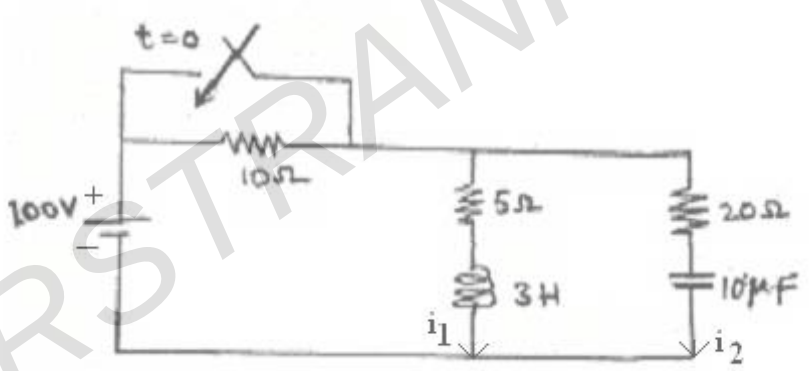

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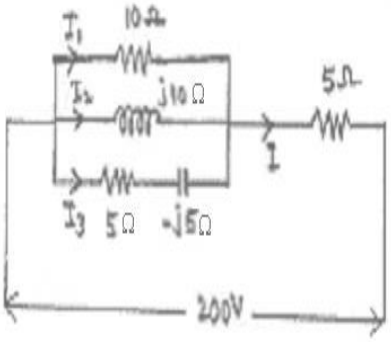

Figure 7b

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(b) Using super position theorem find the current in 2 ohms resistor from the following network shown in figure3b. [6+10]

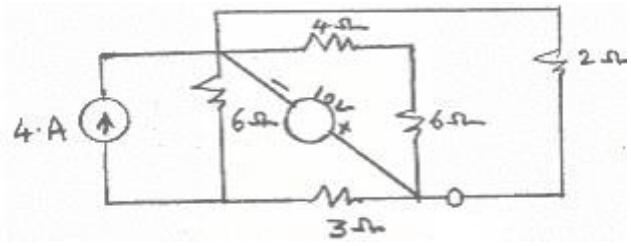

Figure 3b

4. (a) Find ABCD parameters for the following network shown in figure4a.

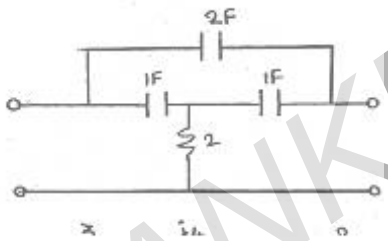

Figure 4a

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(b) Three impedances are connected in figure 5b shown across a 400V, 50HZ, 3 phase supply. Find the readings of the watt meters. [10+6]

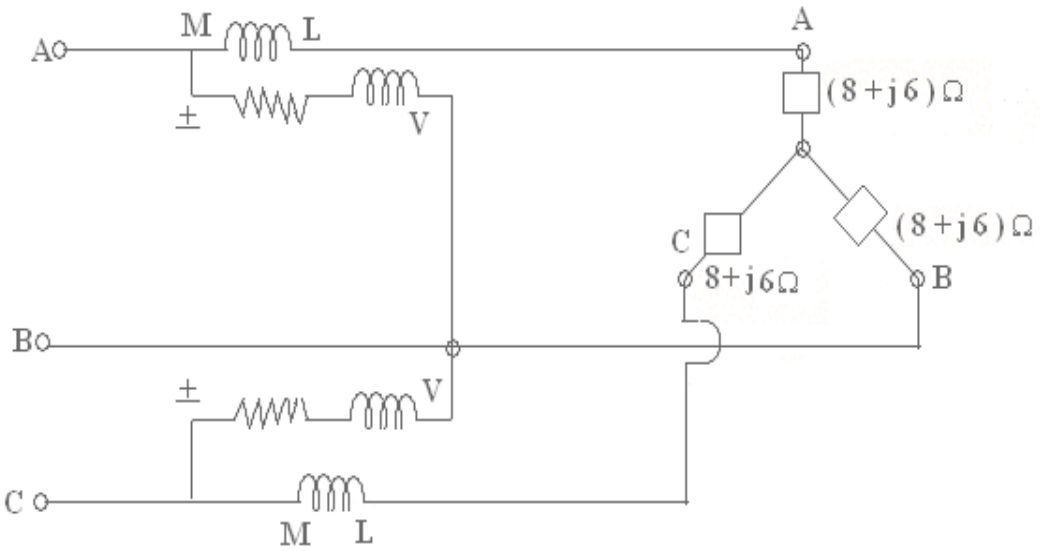

Figure 5b

6. (a) Write down the integro differential equations for the magnetically coupled circuit shown in figure1a. The mutual inductences between L_1 and L_2, L_2 and L_3, and L_3 and L_1 are respectively M_{12}, M_{23} and M_{13}.

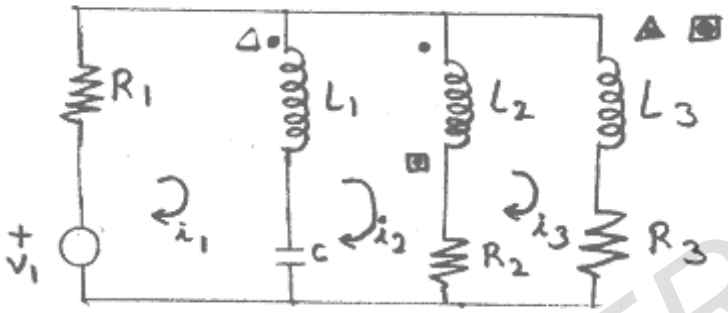

Figure 1a

(b) Derive the relation between the flux density B and magnetising force H. Also derive the expression for reluctance. [8+8]

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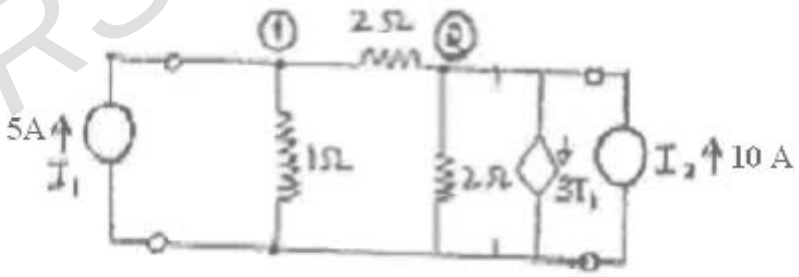

Figure 6b

(c) Obtain the expression for the propagation constant of symmetrical T-network. [4+8+4]

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Code No: RR10204 **RR** **Set No. 1**

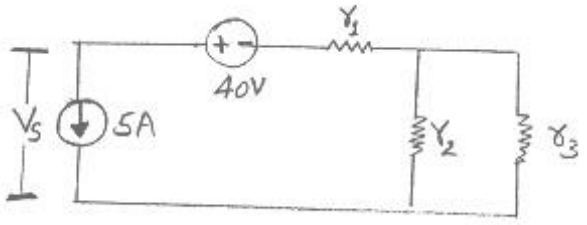

Figure 8c

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Code No: RR10204 **RR** **Set No. 3**

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NETWORK THEORY
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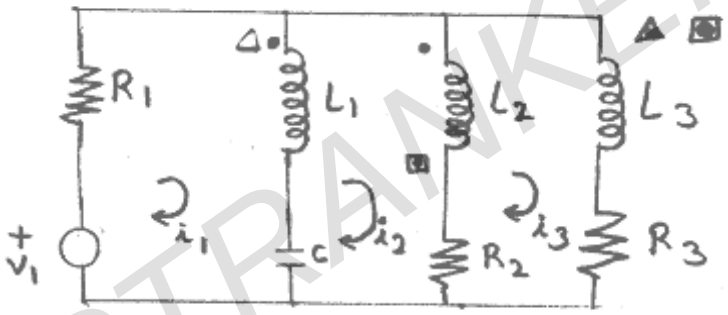

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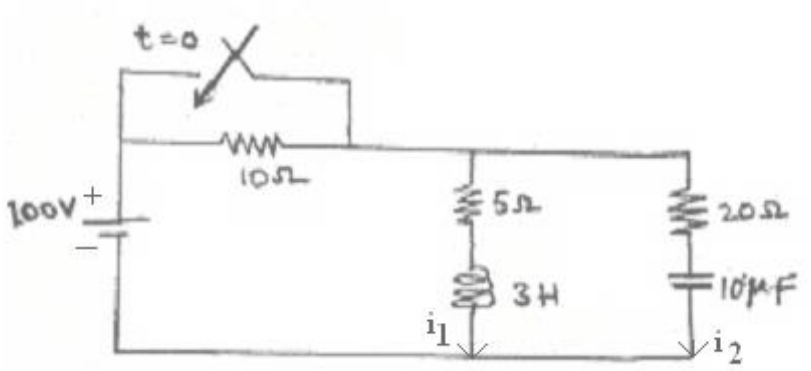

Figure 2c

Code No: RR10204 **RR** **Set No. 3**

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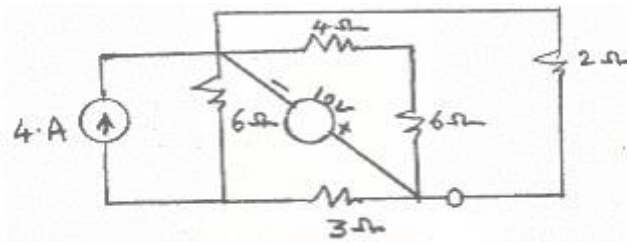

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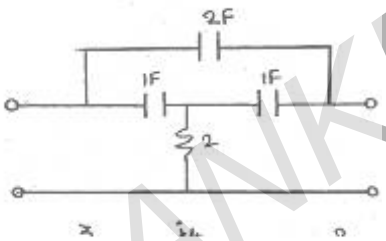

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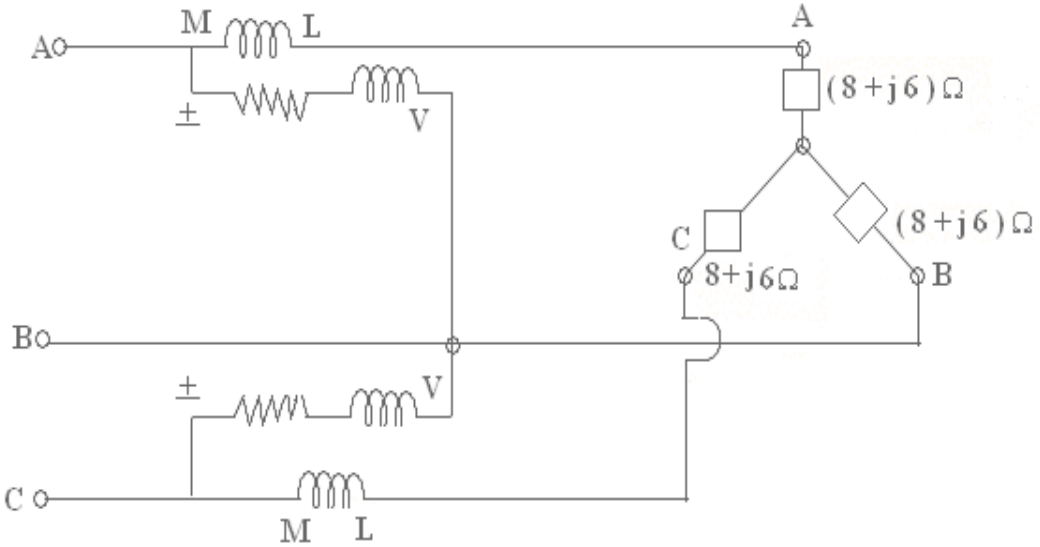

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Code No: RR10204 **RR** **Set No. 3**

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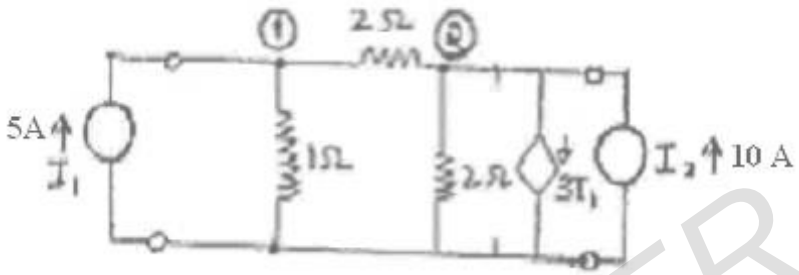

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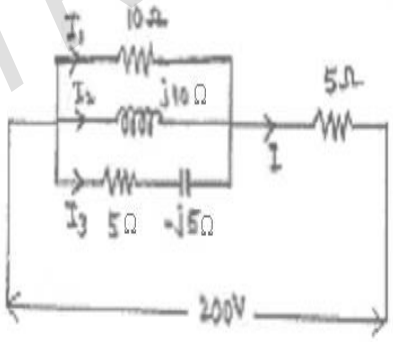

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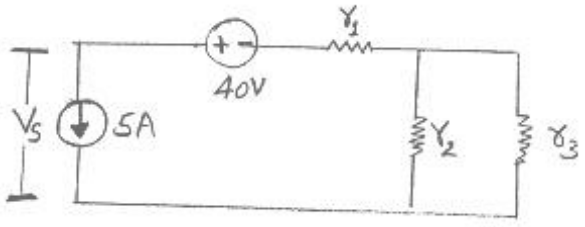

Figure 8c

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