Code No: R07A1EC02 | R07 | Set No. 2

I B.Tech Examinations,June 2011
ELECTRICAL CIRCUIT ANALYSIS
Common to Instrumentation And Control Engineering, Electrical And
Electronics Engineering

Time: 3 hours   Max Marks: 80

Answer any FIVE Questions
All Questions carry equal marks
⋆ ⋆ ⋆ ⋆ ⋆

1. Write down the cut-set matrix of the network shown in figure 2 after drawing its graph and selecting a suitable tree. Consider all resistances as R.   [16]
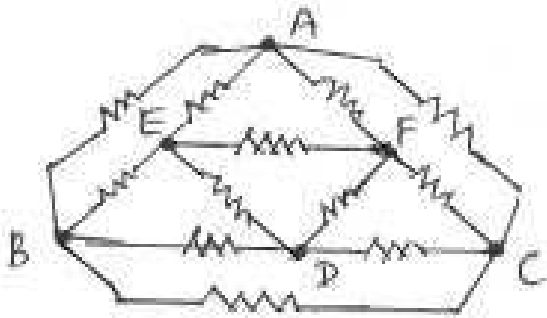

Figure 2

2. For the two port n/w shown in the figure 8, the currents I_1 and I_2 entering at port 1 and 2 respectively are given by the equations.
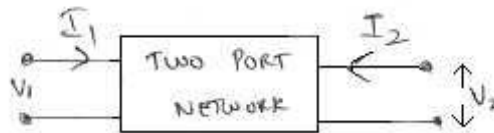$I_1 = 0.5\ V_1 - 0.2\ V_2$
$I_2 = -\ 0.2V_1 + V_2$

Figure 8

Where V_1 and V_2 are the port voltages at port 1 and 2 respectively. Find the Y, Z, ABCD parameters for the n/w. Also find its equivalent π network.   [16]

3. (a) Derive an expression for the current, impedance, average power for a series RC circuit excited by a sinusoidally alternating voltage and also find the power factor of the circuit. Draw the phasor diagram.

   (b) A series R-L series circuit having a resistance of 4Ω and 3 ohms inductive reactance is fed by 100V, 50Hz, 1- ϕ supply. Find current, power drawn by the circuit and power factor.   [8+8]

1

4. (a) State and explain compensation theorem.

   (b) For the circuit shown in figure 7b, find the value of current through 1 ohm in the arm PQ using Thevenin's theorem. [6+10]
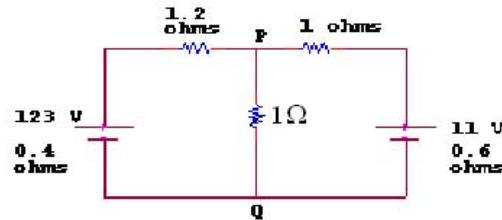

Figure 7b

5. (a) Four resistances of equal value are available. Find

   i. The total equivalent conductance and total equivalent resistance ratio

   ii. The ratios of current drawn in each configuration

   iii. The ratios of power drawn by each configuration in each element. Considering that the supply voltage is same when the configuration are in series and parallel.

   (b) Find R_{AB} in the network as shown in figure 3b. [10+6]
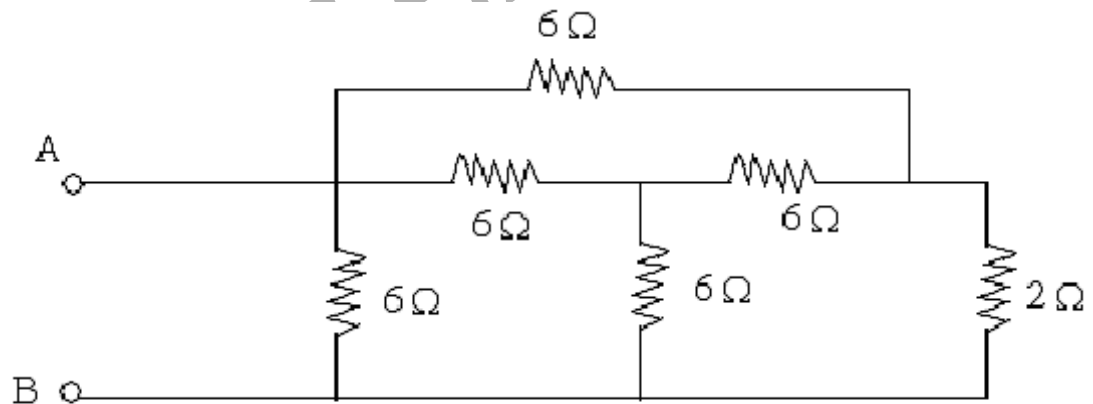

Figure 3b

6. (a) Three identical impedances of $(3+j4)\Omega$ are connected in delta. Find an equivalent star network such that the line current is the same when connected to the same supply.

   (b) Three impedances of $(7+j4)\Omega$, $(3+j2)\Omega$ and $(9+j2)\Omega$ are connected between neutral and the R, Y and B phases. The line voltage is 440V, Calculate.

   i. The line currents and

   ii. The current in the neutral wire.

   iii. Find the power consumed in each phase and the total power drawn by the circuit. [4+12]

2

7. (a) In the circuit shown in figure 5a, the switch S is in position 1 for a long time and brought the position 2 at time t = 0. Determine the circuit current.
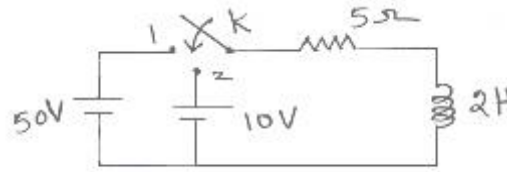

Figure 5a

   (b) Determine the value of undamped natural frequency of oscillations of a RLC circuit with R = 10 ohms, L = 4H, C = 6F. [8+8]

8. (a) Derive an expression for the energy stored in an inductor and a capacitor.

   (b) Obtain an expression for Co-efficient of coupling. [10+6]

⋆ ⋆ ⋆ ⋆ ⋆

Code No: **R07A1EC02** | **R07** | **Set No. 4**

I B.Tech Examinations,June 2011
ELECTRICAL CIRCUIT ANALYSIS
Common to Instrumentation And Control Engineering, Electrical And
Electronics Engineering

Time: 3 hours   Max Marks: 80
Answer any FIVE Questions
All Questions carry equal marks
⋆ ⋆ ⋆ ⋆ ⋆

1. (a) Three identical impedances of $(3+j4)\Omega$ are connected in delta. Find an equivalent star network such that the line current is the same when connected to the same supply.

   (b) Three impedances of $(7+j4)\Omega$, $(3+j2)\Omega$ and $(9+j2)\Omega$ are connected between neutral and the R, Y and B phases. The line voltage is 440V, Calculate.

      i. The line currents and

      ii. The current in the neutral wire.

      iii. Find the power consumed in each phase and the total power drawn by the circuit.   [4+12]

2. Write down the cut-set matrix of the network shown in figure 2 after drawing its graph and selecting a suitable tree. Consider all resistances as R.   [16]
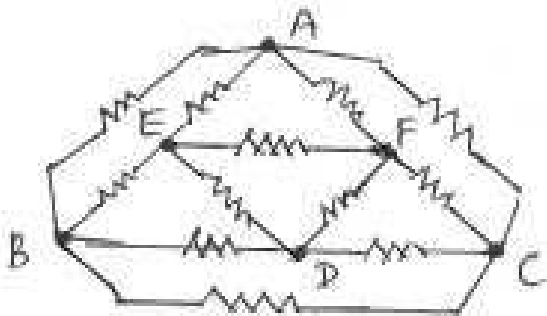

Figure 2

3. (a) In the circuit shown in figure 5a, the switch S is in position 1 for a long time and brought the position 2 at time t = 0. Determine the circuit current.
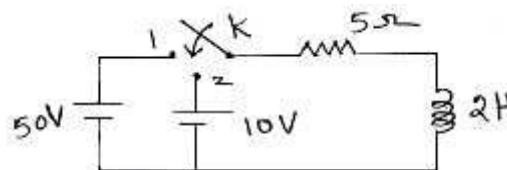

Figure 5a

4

(b) Determine the value of undamped natural frequency of oscillations of a RLC circuit with R = 10 ohms, L = 4H, C = 6F.   [8+8]

4. (a) Derive an expression for the current, impedance, average power for a series RC circuit excited by a sinusoidally alternating voltage and also find the power factor of the circuit. Draw the phasor diagram.

   (b) A series R-L series circuit having a resistance of 4Ω and 3 ohms inductive reactance is fed by 100V, 50Hz, 1- ϕ supply. Find current, power drawn by the circuit and power factor.   [8+8]

5. (a) Derive an expression for the energy stored in an inductor and a capacitor.

   (b) Obtain an expression for Co-efficient of coupling.   [10+6]

6. For the two port n/w shown in the figure 8, the currents I_1 and I_2 entering at port 1 and 2 respectively are given by the equations.
   $I_1 = 0.5 \ V_1 - 0.2 \ V_2$
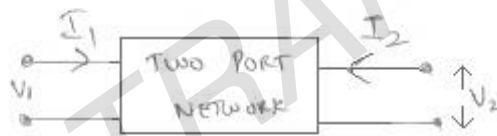 $I_2 = -0.2V_1 + V_2$

Figure 8

Where V_1 and V_2 are the port voltages at port 1 and 2 respectively. Find the Y, Z, ABCD parameters for the n/w. Also find its equivalent π network.   [16]

7. (a) State and explain compensation theorem.

   (b) For the circuit shown in figure 7b, find the value of current through 1 ohm in the arm PQ using Thevenin's theorem.   [6+10]
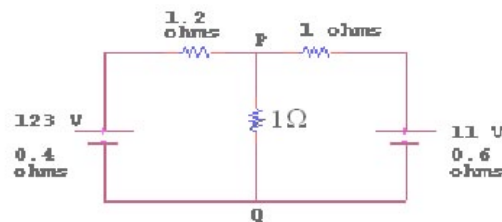

Figure 7b

8. (a) Four resistances of equal value are available. Find

   i. The total equivalent conductance and total equivalent resistance ratio

   ii. The ratios of current drawn in each configuration

   iii. The ratios of power drawn by each configuration in each element.
       Considering that the supply voltage is same when the configuration are in series and parallel.

5

(b) Find R_{AB} in the network as shown in figure 3b.   [10+6]

Figure 3b
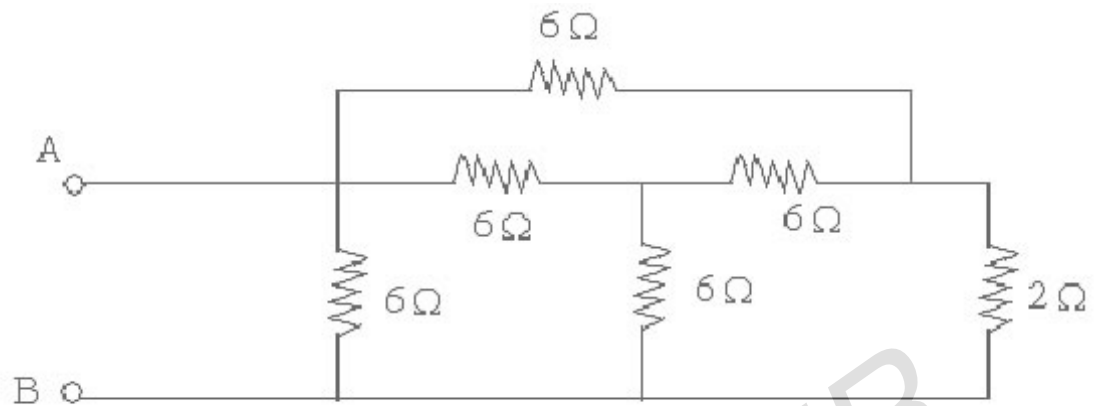
$\star\star\star\star\star$

Code No: R07A1EC02   **R07**   **Set No. 1**

I B.Tech Examinations,June 2011
ELECTRICAL CIRCUIT ANALYSIS
Common to Instrumentation And Control Engineering, Electrical And
Electronics Engineering

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

Answer any FIVE Questions
All Questions carry equal marks

⋆ ⋆ ⋆ ⋆ ⋆

1. (a) Derive an expression for the current, impedance, average power for a series RC circuit excited by a sinusoidally alternating voltage and also find the power factor of the circuit. Draw the phasor diagram.

   (b) A series R-L series circuit having a resistance of 4Ω and 3 ohms inductive reactance is fed by 100V, 50Hz, 1-ϕ supply. Find current, power drawn by the circuit and power factor.   [8+8]

2. (a) State and explain compensation theorem.

   (b) For the circuit shown in figure 7b, find the value of current through 1 ohm in the arm PQ using Thevenin's theorem.   [6+10]
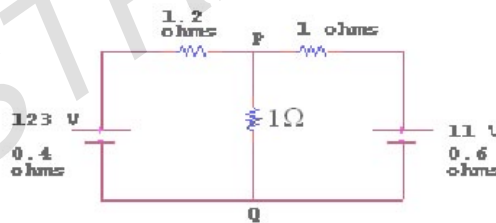
Figure 7b

3. (a) In the circuit shown in figure 5a, the switch S is in position 1 for a long time and brought the position 2 at time t = 0. Determine the circuit current.
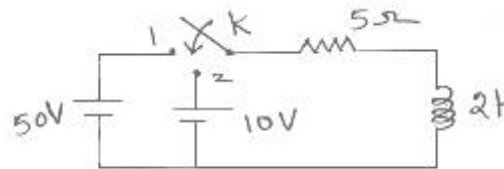
Figure 5a

   (b) Determine the value of undamped natural frequency of oscillations of a RLC circuit with R = 10 ohms, L = 4H, C = 6F.   [8+8]

4. (a) Three identical impedances of $(3+j4)\Omega$ are connected in delta. Find an equivalent star network such that the line current is the same when connected to the same supply.

   (b) Three impedances of $(7+j4)\Omega$, $(3+j2)\Omega$ and $(9+j2)\Omega$ are connected between neutral and the R, Y and B phases. The line voltage is 440V, Calculate.

7

        i. The line currents and

        ii. The current in the neutral wire.

        iii. Find the power consumed in each phase and the total power drawn by the circuit. [4+12]

5. (a) Derive an expression for the energy stored in an inductor and a capacitor.

   (b) Obtain an expression for Co-efficient of coupling. [10+6]

6. Write down the cut-set matrix of the network shown in figure 2 after drawing its graph and selecting a suitable tree. Consider all resistances as R. [16]
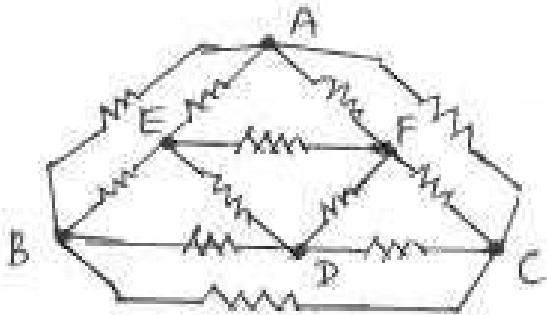

Figure 2

7. (a) Four resistances of equal value are available. Find

      i. The total equivalent conductance and total equivalent resistance ratio

      ii. The ratios of current drawn in each configuration

      iii. The ratios of power drawn by each configuration in each element. Considering that the supply voltage is same when the configuration are in series and parallel.

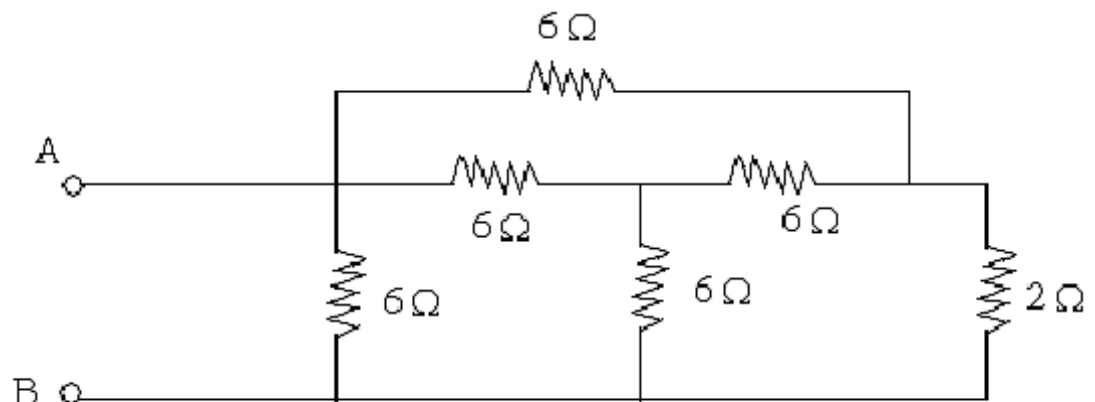   (b) Find R_{AB} in the network as shown in figure 3b. [10+6]

Figure 3b

8

8. For the two port n/w shown in the figure 8, the currents I_1 and I_2 entering at port 1 and 2 respectively are given by the equations.
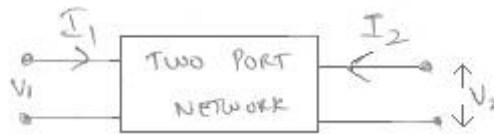
$I_1 = 0.5\ V_1 - 0.2\ V_2$

$I_2 = -0.2V_1 + V_2$

Figure 8

Where V_1 and V_2 are the port voltages at port 1 and 2 respectively. Find the Y, Z, ABCD parameters for the n/w. Also find its equivalent π network. [16]

$\star\star\star\star\star$

9

www.firstranker.com

Code No: R07A1EC02 $\boxed{\textbf{R07}}$ $\boxed{\textbf{Set No. 3}}$

I B.Tech Examinations,June 2011
ELECTRICAL CIRCUIT ANALYSIS
Common to Instrumentation And Control Engineering, Electrical And
Electronics Engineering

Time: 3 hours   Max Marks: 80
Answer any FIVE Questions
All Questions carry equal marks
$\star\star\star\star\star$

1. (a) Three identical impedances of $(3+j4)\Omega$ are connected in delta. Find an equivalent star network such that the line current is the same when connected to the same supply.

   (b) Three impedances of $(7+j4)\Omega$, $(3+j2)\Omega$ and $(9+j2)\Omega$ are connected between neutral and the R, Y and B phases. The line voltage is 440V, Calculate.

      i. The line currents and
      ii. The current in the neutral wire.
      iii. Find the power consumed in each phase and the total power drawn by the circuit. [4+12]

2. Write down the cut-set matrix of the network shown in figure 2 after drawing its graph and selecting a suitable tree. Consider all resistances as R. [16]
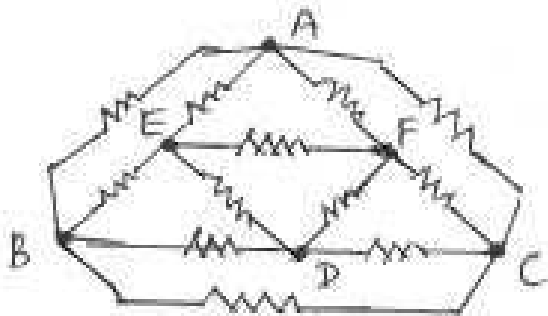

Figure 2

3. (a) Four resistances of equal value are available. Find

      i. The total equivalent conductance and total equivalent resistance ratio
      ii. The ratios of current drawn in each configuration
      iii. The ratios of power drawn by each configuration in each element.
         Considering that the supply voltage is same when the configuration are in series and parallel.

   (b) Find R_{AB} in the network as shown in figure 3b. [10+6]

10

www.firstranker.com
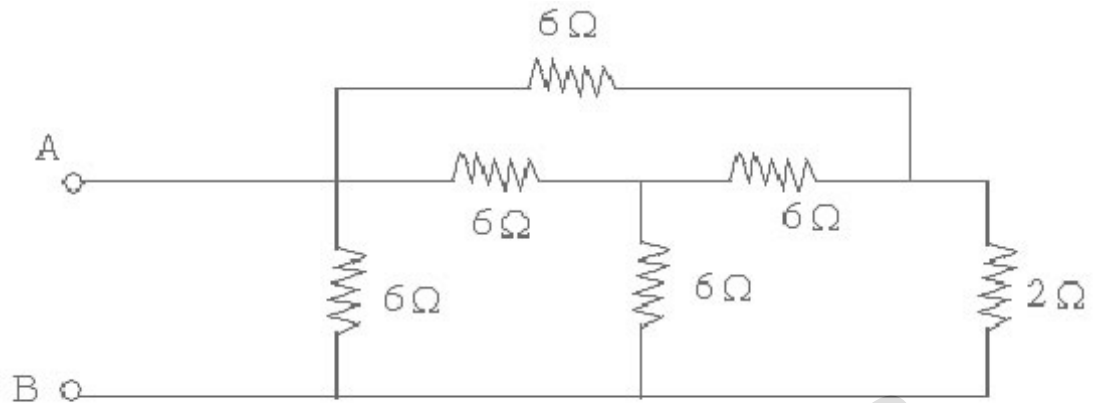
Figure 3b

4. (a) Derive an expression for the current, impedance, average power for a series RC circuit excited by a sinusoidally alternating voltage and also find the power factor of the circuit. Draw the phasor diagram.

   (b) A series R-L series circuit having a resistance of 4Ω and 3 ohms inductive reactance is fed by 100V, 50Hz, 1-ϕ supply. Find current, power drawn by the circuit and power factor. [8+8]

5. (a) In the circuit shown in figure 5a, the switch S is in position 1 for a long time and brought the position 2 at time t = 0. Determine the circuit current.
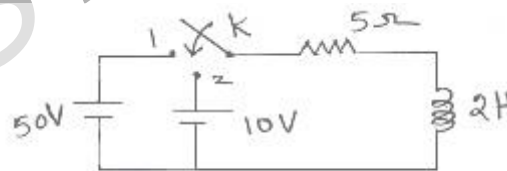

Figure 5a

   (b) Determine the value of undamped natural frequency of oscillations of a RLC circuit with R = 10 ohms, L = 4H, C = 6F. [8+8]

6. (a) Derive an expression for the energy stored in an inductor and a capacitor.

   (b) Obtain an expression for Co-efficient of coupling. [10+6]

7. (a) State and explain compensation theorem.

   (b) For the circuit shown in figure 7b, find the value of current through 1 ohm in the arm PQ using Thevenin's theorem. [6+10]
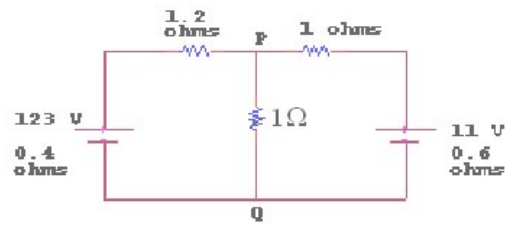
11

Figure 7b

8. For the two port n/w shown in the figure 8, the currents I_1 and I_2 entering at port 1 and 2 respectively are given by the equations.
$I_1 = 0.5\ V_1 - 0.2\ V_2$
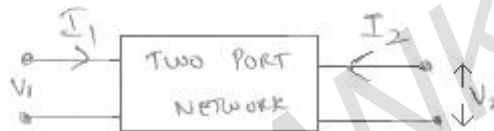$I_2 = -\ 0.2V_1 + V_2$

Figure 8

Where V_1 and V_2 are the port voltages at port 1 and 2 respectively. Find the Y, Z, ABCD parameters for the n/w. Also find its equivalent π network.   [16]

⋆ ⋆ ⋆ ⋆ ⋆

12