

Code No: R07A1EC02

R07**Set No. 2**

**I B.Tech Examinations, December 2010
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. Find the Z and Y parameters of the circuit shown in figure 2. [16]

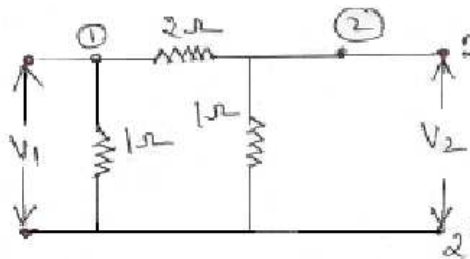


Figure 2

2. Draw the graph of the lattice network shown in the figure 7. Deduce the tie-set and cut-set matrices, and from those, find the relationship between independent and dependent variables. [16]

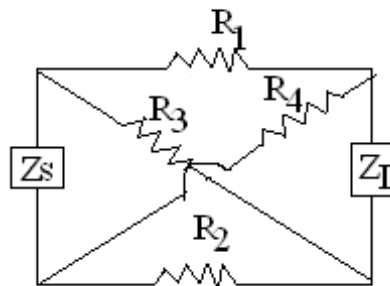


Figure 7

3. Two impedances $(15-j10) \Omega$ and $(10+j15) \Omega$ are connected in parallel. The supply voltage is 200V, 50Hz. Calculate
- The admittance
 - Conductance
 - Susceptance of the combined circuit
 - Total current and
 - Total power factor
 - Total power consumed in each branch and total power.
- [16]

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4. Derive an expression for current response of RLC series circuit with sinusoidal excitation. Assume the circuit is working in critical damping conditions. [16]
5. (a) Calculate load current I_L using Millman's theorem as shown in figure 4a.

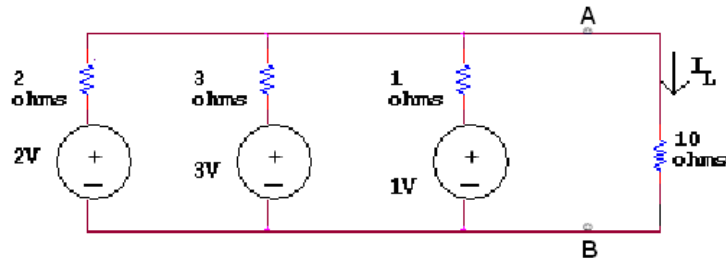


Figure 4a

- (b) State and explain the theorems in voltage and current source representations. [6+10]
6. (a) Derive an expression for the energy stored in an inductor and a capacitor. [10+6]
- (b) Obtain an expression for Co-efficient of coupling.
7. A three phase, 4 wire, 400V, 50Hz system supplies a load of 50KW at a power factor of 0.75 lagging between the red phase and neutral; 60KW at a power factor of 0.85 leading between the yellow phase and neutral and 70KW at unity power factor between the blue phase and neutral. Find the current in the neutral conductor. [16]
8. (a) State and explain the Kirchhoff's Law which can be applied to loop current method.
- (b) For the network shown in figure 1b, determine the equivalent resistance between the terminals A and B, if each resistance value is equal to 1 ohms. [6+10]

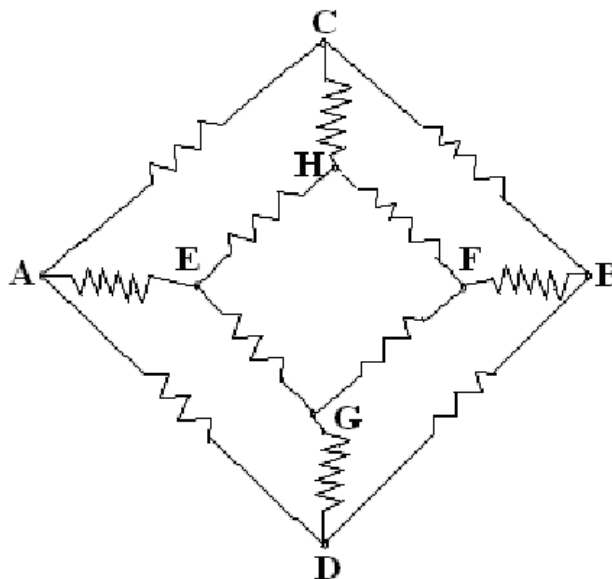


Figure 1b

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R07**Set No. 4**

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- Derive an expression for the energy stored in an inductor and a capacitor.
 - Obtain an expression for Co-efficient of coupling. [10+6]
- State and explain the Kirchhoff's Law which can be applied to loop current method.
 - For the network shown in figure 1b, determine the equivalent resistance between the terminals A and B, if each resistance value is equal to 1 ohms. [6+10]

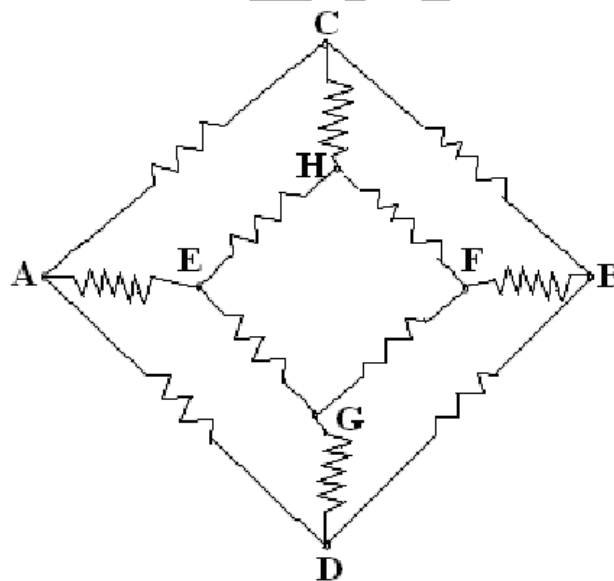


Figure 1b

- Calculate load current I_L using Millman's theorem as shown in figure 4a.

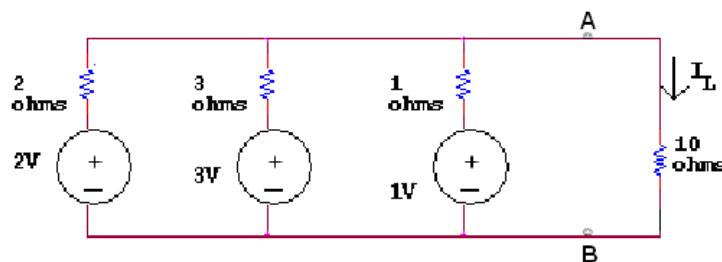


Figure 4a

- State and explain the theorems in voltage and current source representations. [6+10]

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R07**Set No. 4**

4. Find the Z and Y parameters of the circuit shown in figure 2. [16]

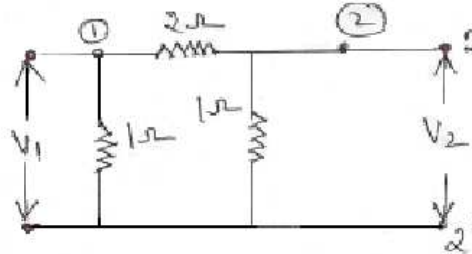


Figure 2

5. Draw the graph of the lattice network shown in the figure 7. Deduce the tie-set and cut-set matrices, and from those, find the relationship between independent and dependent variables. [16]

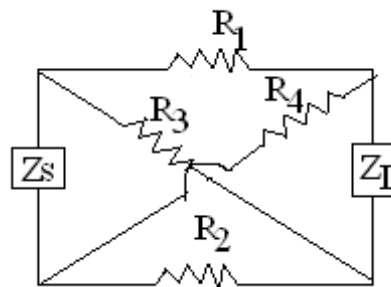


Figure 7

6. Derive an expression for current response of RLC series circuit with sinusoidal excitation. Assume the circuit is working in critical damping conditions. [16]
7. A three phase, 4 wire, 400V, 50Hz system supplies a load of 50KW at a power factor of 0.75 lagging between the red phase and neutral; 60KW at a power factor of 0.85 leading between the yellow phase and neutral and 70KW at unity power factor between the blue phase and neutral. Find the current in the neutral conductor. [16]
8. Two impedances $(15-j10) \Omega$ and $(10+j15) \Omega$ are connected in parallel. The supply voltage is 200V, 50Hz. Calculate
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R07**Set No. 1**

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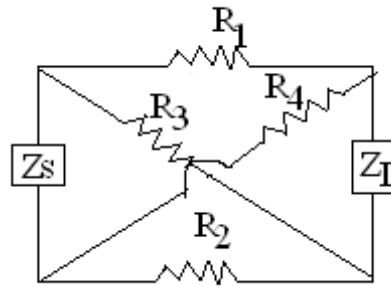


Figure 7

2. (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]
3. A three phase, 4 wire, 400V, 50Hz system supplies a load of 50KW at a power factor of 0.75 lagging between the red phase and neutral; 60KW at a power factor of 0.85 leading between the yellow phase and neutral and 70KW at unity power factor between the blue phase and neutral. Find the current in the neutral conductor. [16]
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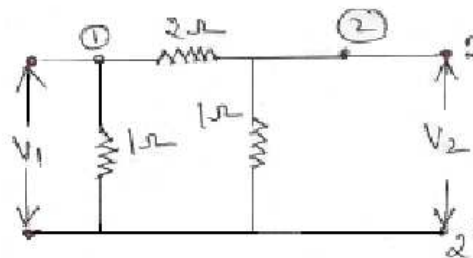


Figure 2

5. (a) State and explain the Kirchhoff's Law which can be applied to loop current method.

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- (b) For the network shown in figure 1b, determine the equivalent resistance between the terminals A and B, if each resistance value is equal to 1 ohms.

[6+10]

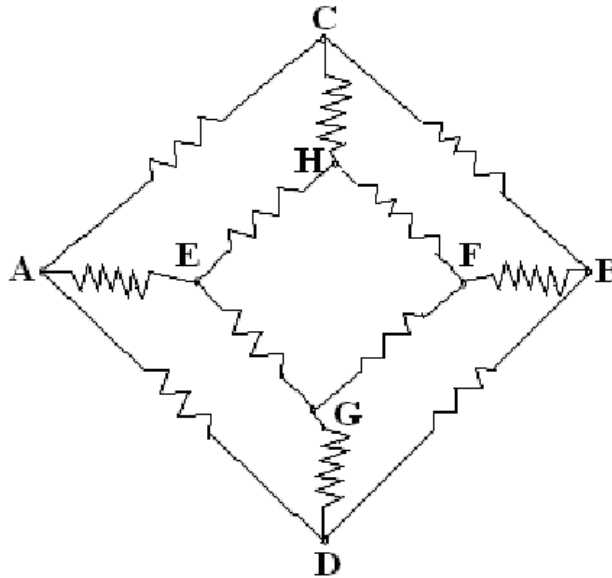


Figure 1b

6. Two impedances $(15-j10) \Omega$ and $(10+j15) \Omega$ are connected in parallel. The supply voltage is 200V, 50Hz. Calculate
- The admittance
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8. (a) Calculate load current I_L using Millman's theorem as shown in figure 4a.

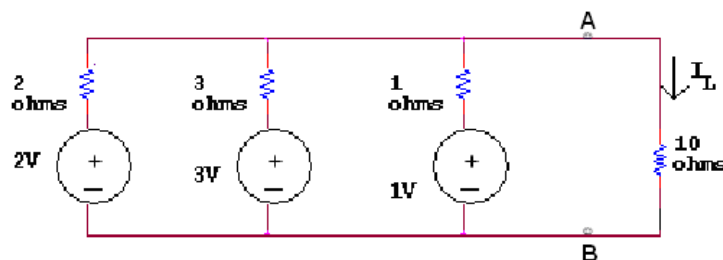


Figure 4a

- (b) State and explain the theorems in voltage and current source representations.

[6+10]

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R07**Set No. 3**

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- (b) For the network shown in figure 1b, determine the equivalent resistance between the terminals A and B, if each resistance value is equal to 1 ohms.

[6+10]

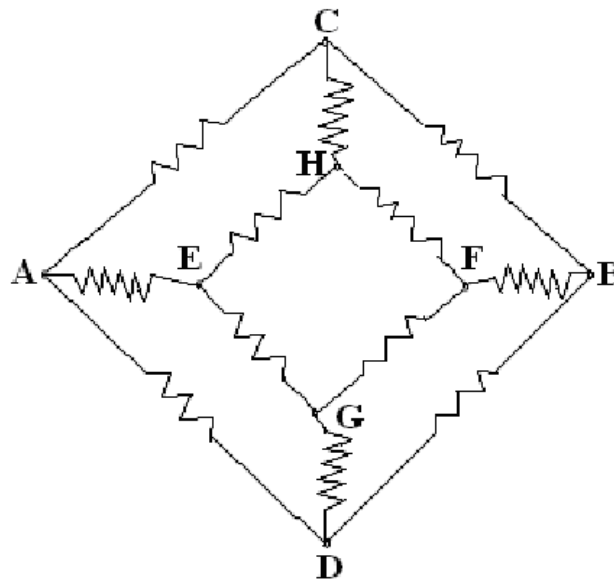


Figure 1b

- Find the Z and Y parameters of the circuit shown in figure 2.

[16]

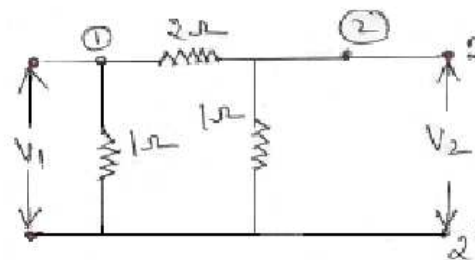


Figure 2

- (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]

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R07**Set No. 3**

4. (a) Calculate load current I_L using Millman's theorem as shown in figure 4a.

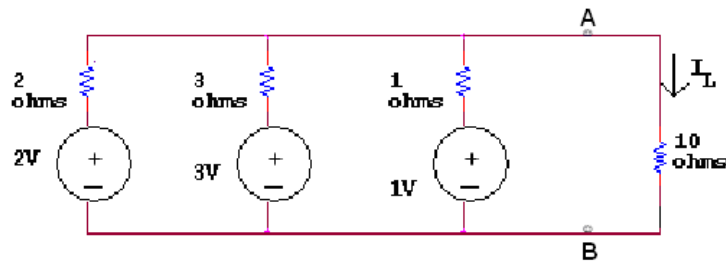


Figure 4a

- (b) State and explain the theorems in voltage and current source representations. [6+10]

5. A three phase, 4 wire, 400V, 50Hz system supplies a load of 50KW at a power factor of 0.75 lagging between the red phase and neutral; 60KW at a power factor of 0.85 leading between the yellow phase and neutral and 70KW at unity power factor between the blue phase and neutral. Find the current in the neutral conductor. [16]
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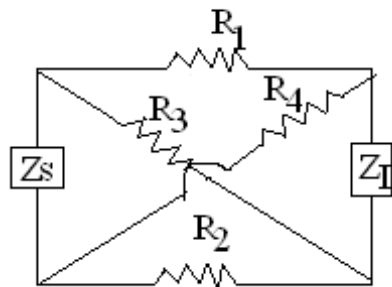


Figure 7

8. Two impedances $(15-j10) \Omega$ and $(10+j15) \Omega$ are connected in parallel. The supply voltage is 200V, 50Hz. Calculate
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