

Code No: R07A1EC07

R07**Set No. 2**

**I B.Tech Examinations, December 2010
BASIC ELECTRICAL ENGINEERING**

**Common to Information Technology, Computer Science And Engineering,
Computer Science And Systems Engineering**

Time: 3 hours

Max Marks: 80

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

1. (a) A 4 pole, 210V wave connected shunt motor gives 15 KW when running at 750 rpm and drawing armature and field currents of 30 A and 2 A respectively. It has 320 conductors. Its resistance is 0.15Ω . Assuming drop of 1V per brush. Find
 - i. Total torque
 - ii. Useful torque
 - iii. Useful flux per pole
 - iv. Efficiency.
- (b) A long shunt dc generator delivers a load current of 120A at 320V. The resistance of the armature, series and shunt fields are 0.15Ω , 0.05Ω and 125Ω . Calculate the emf induced in the armature. Allow a brush contact drop of 2V. [8+8]
2. (a) Explain in detail how a magnetic field is produced due to the electric current.
- (b) By applying Kirchoff's law, find the current through all the elements in the circuit as shown in the figure 6b. [4+12]

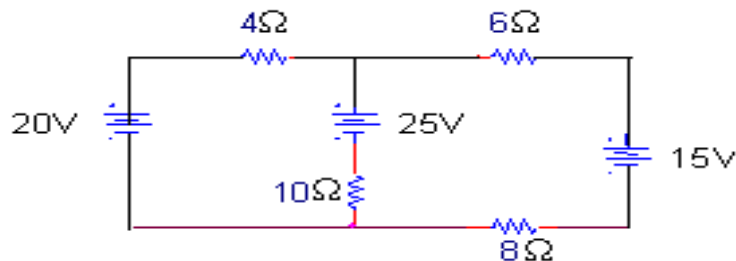


Figure 6b

3. (a) Give the areas of applications of induction motor.
- (b) Explain how the rotor rotates in a 3 phase induction motor.
- (c) A three phase induction motor does not run at synchronous speed. Why?
- (d) Explain the effect of change in rotor resistance on the torque - slip characteristics. [4+4+4+4]
4. Explain the behaviour of AC through
 - (a) Pure R
 - (b) Pure L

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(c) Pure C circuits.

For each case, derive the instantaneous value of V and I, Impedance, Average power, Power factor, Instantaneous power and the relevant phasors. [5+5+6]

5. (a) Define mutual inductance. Obtain an expression for the same.
- (b) The number of turns in a coil is 250 when a current of 2A flows in this coil, the flux in the coil is 0.3 mwb. When this current is reduced to zero in 2 ms, the voltage induced in a coil lying in the vicinity of coil is 63.75 V. If the coefficient of coupling between the coils is 0.75, find self inductances of two coils, mutual inductance and no of turns in the second coil. [6+10]
6. (a) Explain the construction of a single phase transformer.
- (b) Discuss in detail the difference between a core type and a shell type transformer. [10+6]
7. Explain with neat sketch the construction and working of a MI ammeter and MC ammeter. [16]
8. Determine the power loss in the 10Ω resistor by using Thevenin's theorem as shown in figure 1. [16]

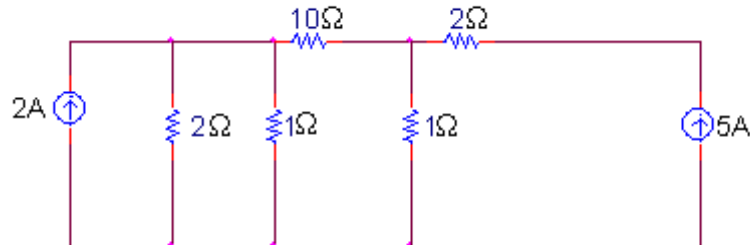


Figure 1

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R07**Set No. 4**

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BASIC ELECTRICAL ENGINEERING**

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Time: 3 hours

Max Marks: 80

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

1. (a) A 4 pole, 210V wave connected shunt motor gives 15 KW when running at 750 rpm and drawing armature and field currents of 30 A and 2 A respectively. It has 320 conductors. Its resistance is 0.15Ω . Assuming drop of 1V per brush. Find
 - i. Total torque
 - ii. Useful torque
 - iii. Useful flux per pole
 - iv. Efficiency.
- (b) A long shunt dc generator delivers a load current of 120A at 320V. The resistance of the armature, series and shunt fields are 0.15Ω , 0.05Ω and 125Ω . Calculate the emf induced in the armature. Allow a brush contact drop of 2V. [8+8]
2. (a) Define mutual inductance. Obtain an expression for the same.
- (b) The number of turns in a coil is 250 when a current of 2A flows in this coil, the flux in the coil is 0.3 mwb. When this current is reduced to zero in 2 ms, the voltage induced in a coil lying in the vicinity of coil is 63.75 V. If the coefficient of coupling between the coils is 0.75, find self inductances of two coils, mutual inductance and no of turns in the second coil. [6+10]
3. Explain with neat sketch the construction and working of a MI ammeter and MC ammeter. [16]
4. Determine the power loss in the 10Ω resistor by using Thevenin's theorem as shown in figure 1. [16]

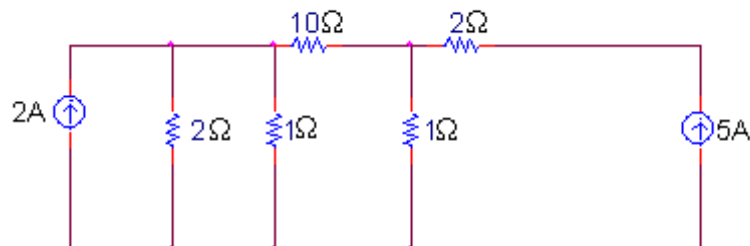


Figure 1

5. (a) Explain the construction of a single phase transformer.

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- (b) Discuss in detail the difference between a core type and a shell type transformer. [10+6]
6. (a) Give the areas of applications of induction motor.
 (b) Explain how the rotor rotates in a 3 phase induction motor.
 (c) A three phase induction motor does not run at synchronous speed. Why?
 (d) Explain the effect of change in rotor resistance on the torque - slip characteristics. [4+4+4+4]
7. Explain the behaviour of AC through
 (a) Pure R
 (b) Pure L
 (c) Pure C circuits.

For each case, derive the instantaneous value of V and I, Impedance, Average power, Power factor, Instantaneous power and the relevant phasors. [5+5+6]

8. (a) Explain in detail how a magnetic field is produced due to the electric current.
 (b) By applying Kirchoff's law, find the current through all the elements in the circuit as shown in the figure 6b. [4+12]

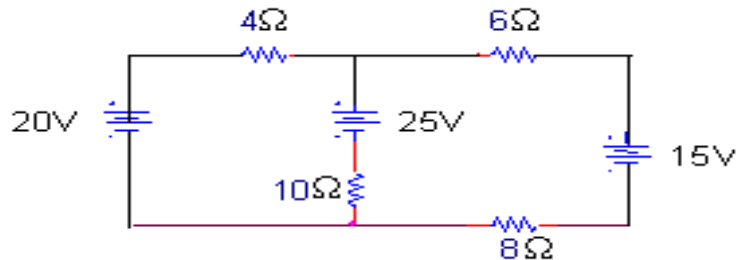


Figure 6b

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R07**Set No. 1**

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

- Explain with neat sketch the construction and working of a MI ammeter and MC ammeter. [16]
- Explain the construction of a single phase transformer.
 - Discuss in detail the difference between a core type and a shell type transformer. [10+6]
- A 4 pole, 210V wave connected shunt motor gives 15 KW when running at 750 rpm and drawing armature and field currents of 30 A and 2 A respectively. It has 320 conductors. Its resistance is 0.15Ω . Assuming drop of 1V per brush. Find
 - Total torque
 - Useful torque
 - Useful flux per pole
 - Efficiency.
 - A long shunt dc generator delivers a load current of 120A at 320V. The resistance of the armature, series and shunt fields are 0.15Ω , 0.05Ω and 125Ω . Calculate the emf induced in the armature. Allow a brush contact drop of 2V. [8+8]
- Explain in detail how a magnetic field is produced due to the electric current.
 - By applying Kirchoff's law, find the current through all the elements in the circuit as shown in the figure 6b. [4+12]

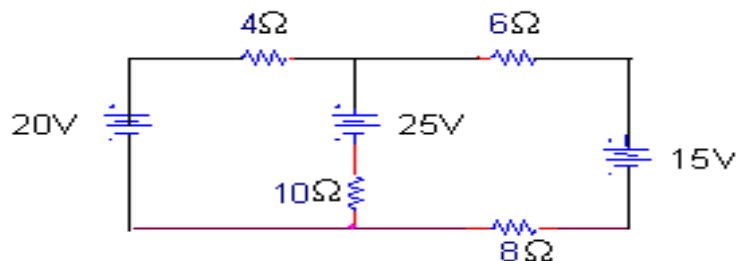


Figure 6b

- Define mutual inductance. Obtain an expression for the same.
 - The number of turns in a coil is 250 when a current of 2A flows in this coil, the flux in the coil is 0.3 mwb. When this current is reduced to zero in 2

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ms, the voltage induced in a coil lying in the vicinity of coil is 63.75 V. If the coefficient of coupling between the coils is 0.75, find self inductances of two coils, mutual inductance and no of turns in the second coil. [6+10]

6. (a) Give the areas of applications of induction motor.
 (b) Explain how the rotor rotates in a 3 phase induction motor.
 (c) A three phase induction motor does not run at synchronous speed. Why?
 (d) Explain the effect of change in rotor resistance on the torque - slip characteristics. [4+4+4+4]
7. Explain the behaviour of AC through
 (a) Pure R
 (b) Pure L
 (c) Pure C circuits.

For each case, derive the instantaneous value of V and I, Impedance, Average power, Power factor, Instantaneous power and the relevant phasors. [5+5+6]

8. Determine the power loss in the 10Ω resistor by using Thevenin's theorem as shown in figure 1. [16]

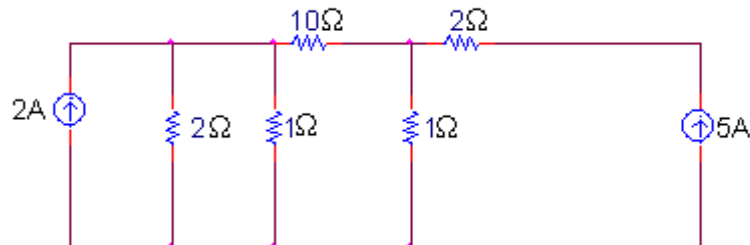


Figure 1

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R07**Set No. 3**

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Time: 3 hours

Max Marks: 80

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

1. Determine the power loss in the 10Ω resistor by using Thevenin's theorem as shown in figure 1. [16]

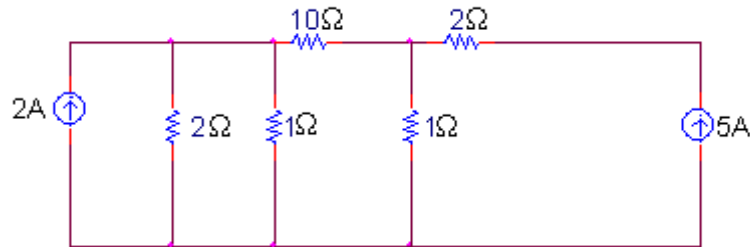


Figure 1

2. Explain the behaviour of AC through

- Pure R
- Pure L
- Pure C circuits.

For each case, derive the instantaneous value of V and I, Impedance, Average power, Power factor, Instantaneous power and the relevant phasors. [5+5+6]

3. (a) Define mutual inductance. Obtain an expression for the same.
 (b) The number of turns in a coil is 250 when a current of 2A flows in this coil, the flux in the coil is 0.3 mwb. When this current is reduced to zero in 2 ms, the voltage induced in a coil lying in the vicinity of coil is 63.75 V. If the coefficient of coupling between the coils is 0.75, find self inductances of two coils, mutual inductance and no of turns in the second coil. [6+10]
4. (a) A 4 pole, 210V wave connected shunt motor gives 15 KW when running at 750 rpm and drawing armature and field currents of 30 A and 2 A respectively. It has 320 conductors. Its resistance is 0.15Ω . Assuming drop of 1V per brush. Find
- Total torque
 - Useful torque
 - Useful flux per pole
 - Efficiency.

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- (b) A long shunt dc generator delivers a load current of 120A at 320V. The resistance of the armature, series and shunt fields are 0.15Ω , 0.05Ω and 125Ω . Calculate the emf induced in the armature. Allow a brush contact drop of 2V. [8+8]
5. (a) Give the areas of applications of induction motor.
 (b) Explain how the rotor rotates in a 3 phase induction motor.
 (c) A three phase induction motor does not run at synchronous speed. Why?
 (d) Explain the effect of change in rotor resistance on the torque - slip characteristics. [4+4+4+4]
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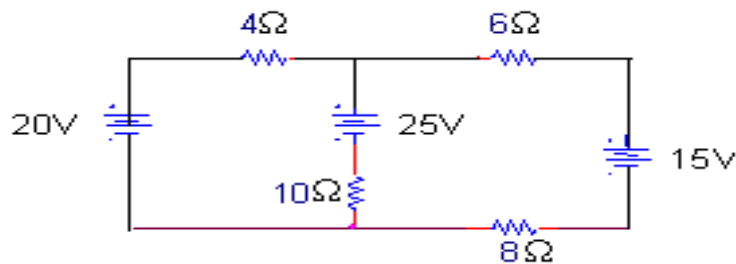


Figure 6b

7. (a) Explain the construction of a single phase transformer.
 (b) Discuss in detail the difference between a core type and a shell type transformer. [10+6]
8. Explain with neat sketch the construction and working of a MI ammeter and MC ammeter. [16]
