Code No: 07A3EC19 **R07** **Set No. 2**

II B.Tech I Semester Examinations,November 2010
ELECTRICAL ENGINEERING
Common to Chemical Engineering, Metallurgy And Material Technology
Time: 3 hours **Max Marks: 80**

Answer any FIVE Questions
All Questions carry equal marks

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1. (a) Explain the parts of the DC machine which are responsible for converting alternating e.m.f into DC at the output terminals.
   (b) A 4 Pole DC shunt generator with lap connected armature supplies a load of 100 Amperes at 200 Volts. The armature and shunt field resistances are 0.1 ohm and 90 ohms respectively. Calculate the current in the each conductor, total current and the generated e.m.f. [8+8]

2. (a) What is meant by Lenz's law? Where this law is useful? Explain the concept of this Law with suitable example.
   (b) A steel ring has a mean diameter of 20 cm, and cross section area of 25 cm^2 and a radial airgap 0.8 mm cut across it. When excited by a current of 1 Ampere through a coil of 1000 turns wound on the ring core, it produces an airgap flux of 1 mwb. Neglect the leakage and fringing. Calculate the relative permeability of steel and total reluctance of the magnetic circuit. [8+8]

3. (a) What are the different types of 3-ϕ induction motors? Explain any one of them.
   (b) An 8 pole alternator runs at 750 rpm and supplies power to a 6-pole induction motor which has at full load, a slip of 3%. Find the full load speed of induction motor and frequency of its rotor emf. [8+8]

4. The following test results are obtained from a 3-ϕ, 6000 KVA, 6600V, star connected, 2 pole, 50 Hz turbo alternator: with a field current of 125A, the OC voltage is 8000V at the rated speed ; with rated speed and same field current, the short circuit current is 800A. At rated full load, the resistance drop is 3%. Find regulation of alternator on full load and 0.8 pf lagging. [16]

5. (a) Discuss how Faraday's laws are useful for production of Torque in DC motors.
   (b) Discuss the Ward Leonard method of Speed control of DC motors. [8+8]

6. Discuss different classifications of analog instruments and explain each of them. [16]

7. A 40 KVA transformer has iron loss of 450 W and full load copper loss of 850 W. If the power factor of the load is 0.8 lagging, calculate:
   (a) full load efficiency
   (b) the KVA load at which maximum efficiency occurs and

(c) the maximum efficiency. [16]

8. (a) Explain the behaviour of a Series R-L Circuit excited by a sinusoidal source under steady state with relevant waveforms and phasor diagram.

(b) The sine waves are represented by the expressions.
e = 280 sin(314wt - $\pi/6$) i = 40 sin(314wt + $\pi/4$)
Find the Maximum and RMS values for these waveforms. Also find the phase difference between the two waveforms. [8+8]

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Code No: 07A3EC19 **R07** **Set No. 4**

II B.Tech I Semester Examinations,November 2010
ELECTRICAL ENGINEERING
Common to Chemical Engineering, Metallurgy And Material Technology
Time: 3 hours **Max Marks: 80**

Answer any FIVE Questions
All Questions carry equal marks

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1. (a) Discuss how Faraday's laws are useful for production of Torque in DC motors.
   (b) Discuss the Ward Leonard method of Speed control of DC motors. [8+8]

2. (a) What are the different types of 3-ϕ induction motors? Explain any one of them.
   (b) An 8 pole alternator runs at 750 rpm and supplies power to a 6-pole induction motor which has at full load, a slip of 3%. Find the full load speed of induction motor and frequency of its rotor emf. [8+8]

3. (a) Explain the behaviour of a Series R-L Circuit excited by a sinusoidal source under steady state with relevant waveforms and phasor diagram.
   (b) The sine waves are represented by the expressions.
   e = 280 sin(314wt - π/6) i = 40 sin(314wt + π/4)
   Find the Maximum and RMS values for these waveforms. Also find the phase difference between the two waveforms. [8+8]

4. Discuss different classifications of analog instruments and explain each of them. [16]

5. (a) Explain the parts of the DC machine which are responsible for converting alternating e.m.f into DC at the output terminals.
   (b) A 4 Pole DC shunt generator with lap connected armature supplies a load of 100 Amperes at 200 Volts. The armature and shunt field resistances are 0.1 ohm and 90 ohms respectively. Calculate the current in the each conductor, total current and the generated e.m.f. [8+8]

6. A 40 KVA transformer has iron loss of 450 W and full load copper loss of 850 W. If the power factor of the load is 0.8 lagging, calculate:
   (a) full load efficiency
   (b) the KVA load at which maximum efficiency occurs and
   (c) the maximum efficiency. [16]

7. The following test results are obtained from a 3-ϕ, 6000 KVA, 6600V, star connected, 2 pole, 50 Hz turbo alternator: with a field current of 125A, the OC voltage is 8000V at the rated speed ; with rated speed and same field current, the short circuit current is 800A. At rated full load, the resistance drop is 3%. Find regulation of alternator on full load and 0.8 pf lagging. [16]

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8. (a) What is meant by Lenz's law? Where this law is useful? Explain the concept of this Law with suitable example.

   (b) A steel ring has a mean diameter of 20 cm, and cross section area of 25 cm^2 and a radial airgap 0.8 mm cut across it. When excited by a current of 1 Ampere through a coil of 1000 turns wound on the ring core, it produces an airgap flux of 1 mwb. Neglect the leakage and fringing. Calculate the relative permeability of steel and total reluctance of the magnetic circuit. [8+8]

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Code No: 07A3EC19 **R07** **Set No. 1**

II B.Tech I Semester Examinations,November 2010
ELECTRICAL ENGINEERING
Common to Chemical Engineering, Metallurgy And Material Technology
Time: 3 hours **Max Marks: 80**

Answer any FIVE Questions
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   (b) Discuss the Ward Leonard method of Speed control of DC motors. [8+8]

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   (b) the KVA load at which maximum efficiency occurs and
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   Find the Maximum and RMS values for these waveforms. Also find the phase difference between the two waveforms. [8+8]

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Code No: 07A3EC19 **R07** **Set No. 3**

II B.Tech I Semester Examinations,November 2010
ELECTRICAL ENGINEERING
Common to Chemical Engineering, Metallurgy And Material Technology
Time: 3 hours **Max Marks: 80**

Answer any FIVE Questions
All Questions carry equal marks

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1. Discuss different classifications of analog instruments and explain each of them. [16]

2. A 40 KVA transformer has iron loss of 450 W and full load copper loss of 850 W. If the power factor of the load is 0.8 lagging, calculate:
   (a) full load efficiency
   (b) the KVA load at which maximum efficiency occurs and
   (c) the maximum efficiency. [16]

3. (a) Explain the parts of the DC machine which are responsible for converting alternating e.m.f into DC at the output terminals.
   (b) A 4 Pole DC shunt generator with lap connected armature supplies a load of 100 Amperes at 200 Volts. The armature and shunt field resistances are 0.1 ohm and 90 ohms respectively. Calculate the current in the each conductor, total current and the generated e.m.f. [8+8]

4. (a) Discuss how Faraday's laws are useful for production of Torque in DC motors.
   (b) Discuss the Ward Leonard method of Speed control of DC motors. [8+8]

5. The following test results are obtained from a 3-ϕ, 6000 KVA, 6600V, star connected, 2 pole, 50 Hz turbo alternator: with a field current of 125A, the OC voltage is 8000V at the rated speed ; with rated speed and same field current, the short circuit current is 800A. At rated full load, the resistance drop is 3%. Find regulation of alternator on full load and 0.8 pf lagging. [16]

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