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

II B.Tech I Semester Examinations,May/June 2012
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) Why is the yoke of a DC machine not laminated, whereas that of an armature core is laminated? Explain.
   (b) The armature of a 6 pole DC generator has wave winding containing 664 conductors. Calculate the generated e.m.f when flux per pole is 0.06 weber and the speed is 300 rpm. At what speed must the armature be driven to generate an e.m.f of 250 volts if the flux per pole is reduced to 0.05 webers? [8+8]

2. A 50 KVA, single phase transformer has an iron loss of 400W and full load copper loss of 800W.
   (a) find the load at which maximum efficiency occurs and the value of maximum efficiency at unity power factor.
   (b) if the maximum efficiency occurs at 80% of full load, find the new core loss and full load copper loss assuming that total full load loss is constant. [16]

3. From the following test results, determine the voltage regulation of a 2000V, 3-ϕ alternator delivering a current of 100 A at
   (a) unity powerfactor
   (b) 0.8 leading powerfactor
   (c) 0.71 lagging powerfactor
   Test results: full load current of 100 A is produced on short circuit by a field excitation of 2.5 A. An emf of 500 V is produced on open circuit by the same excitation. The armature resistance is 0.8 Ω. [16]

4. (a) Explain the principle of operation of the polyphase induction motor.
   (b) Differentiate the slip ring induction motor and squirrel cage induction motor. [8+8]

5. (a) State the logic supporting the Kirchhoff's Laws of Electrical Circuit?
   (b) A coil has a resistance of 22 ohms when its mean temperature is 20 degree centigrade and 26 ohms when its mean temperature is 70 degree centigrade. Find its mean temperature rise, when its resistance is 28 ohms and the ambient temperature is 15 degree centigrade. [8+8]

6. Describe the ammeter shunts with neat diagram, giving their constructional details. [16]

7. (a) What is meant by phase and phase difference?
   (b) A choke coil takes a current of 2 amperes lagging 60 degrees behind the applied voltage of 230 volts at 50 Hz. Calculate the inductance and resistance of the coil.
   (c) Define the terms:
      i. Active power
      ii. Reactive power. [6+6+4]

8. (a) What is the need of a starter for DC motors? Can we use the same starter for the equally rated DC shunt and series motors? If not, explain clearly about it?
   (b) A 25 kW, 250 volt, DC shunt generator has armature and field resistances of 0.05 ohms and 100 ohms respectively. Determine the power developed by the armature when the machine is working as a generator delivering 25 kW output and as a motor taking 25 kW. [8+8]

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

II B.Tech I Semester Examinations,May/June 2012
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) Why is the yoke of a DC machine not laminated, whereas that of an armature core is laminated? Explain.
   (b) The armature of a 6 pole DC generator has wave winding containing 664 conductors. Calculate the generated e.m.f when flux per pole is 0.06 weber and the speed is 300 rpm. At what speed must the armature be driven to generate an e.m.f of 250 volts if the flux per pole is reduced to 0.05 webers? [8+8]

2. (a) Explain the principle of operation of the polyphase induction motor.
   (b) Differentiate the slip ring induction motor and squirrel cage induction motor. [8+8]

3. From the following test results, determine the voltage regulation of a 2000V, 3-ϕ alternator delivering a current of 100 A at
   (a) unity powerfactor
   (b) 0.8 leading powerfactor
   (c) 0.71 lagging powerfactor
   Test results: full load current of 100 A is produced on short circuit by a field excitation of 2.5 A. An emf of 500 V is produced on open circuit by the same excitation. The armature resistance is 0.8 Ω. [16]

4. (a) What is the need of a starter for DC motors? Can we use the same starter for the equally rated DC shunt and series motors? If not, explain clearly about it?
   (b) A 25 kW, 250 volt, DC shunt generator has armature and field resistances of 0.05 ohms and 100 ohms respectively. Determine the power developed by the armature when the machine is working as a generator delivering 25 kW output and as a motor taking 25 kW. [8+8]

5. (a) What is meant by phase and phase difference?
   (b) A choke coil takes a current of 2 amperes lagging 60 degrees behind the applied voltage of 230 volts at 50 Hz. Calculate the inductance and resistance of the coil.
   (c) Define the terms:
      i. Active power

ii. Reactive power. [6+6+4]

6. (a) State the logic supporting the Kirchhoff's Laws of Electrical Circuit?
   (b) A coil has a resistance of 22 ohms when its mean temperature is 20 degree centigrade and 26 ohms when its mean temperature is 70 degree centigrade. Find its mean temperature rise, when its resistance is 28 ohms and the ambient temperature is 15 degree centigrade. [8+8]

7. Describe the ammeter shunts with neat diagram, giving their constructional details. [16]

8. A 50 KVA, single phase transformer has an iron loss of 400W and full load copper loss of 800W.
   (a) find the load at which maximum efficiency occurs and the value of maximum efficiency at unity power factor.
   (b) if the maximum efficiency occurs at 80% of full load, find the new core loss and full load copper loss assuming that total full load loss is constant. [16]

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

II B.Tech I Semester Examinations,May/June 2012
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) State the logic supporting the Kirchhoff's Laws of Electrical Circuit?
   (b) A coil has a resistance of 22 ohms when its mean temperature is 20 degree centigrade and 26 ohms when its mean temperature is 70 degree centigrade. Find its mean temperature rise, when its resistance is 28 ohms and the ambient temperature is 15 degree centigrade. [8+8]

2. A 50 KVA, single phase transformer has an iron loss of 400W and full load copper loss of 800W.
   (a) find the load at which maximum efficiency occurs and the value of maximum efficiency at unity power factor.
   (b) if the maximum efficiency occurs at 80% of full load, find the new core loss and full load copper loss assuming that total full load loss is constant. [16]

3. Describe the ammeter shunts with neat diagram, giving their constructional details. [16]

4. (a) What is meant by phase and phase difference?
   (b) A choke coil takes a current of 2 amperes lagging 60 degrees behind the applied voltage of 230 volts at 50 Hz. Calculate the inductance and resistance of the coil.
   (c) Define the terms:
      i. Active power
      ii. Reactive power. [6+6+4]

5. From the following test results, determine the voltage regulation of a 2000V, 3-ϕ alternator delivering a current of 100 A at
   (a) unity powerfactor
   (b) 0.8 leading powerfactor
   (c) 0.71 lagging powerfactor
   Test results: full load current of 100 A is produced on short circuit by a field excitation of 2.5 A. An emf of 500 V is produced on open circuit by the same excitation. The armature resistance is 0.8 Ω. [16]

6. (a) What is the need of a starter for DC motors? Can we use the same starter for the equally rated DC shunt and series motors? If not, explain clearly about it?

(b) A 25 kW, 250 volt, DC shunt generator has armature and field resistances of 0.05 ohms and 100 ohms respectively. Determine the power developed by the armature when the machine is working as a generator delivering 25 kW output and as a motor taking 25 kW. [8+8]

7. (a) Why is the yoke of a DC machine not laminated, whereas that of an armature core is laminated? Explain.

   (b) The armature of a 6 pole DC generator has wave winding containing 664 conductors. Calculate the generated e.m.f when flux per pole is 0.06 weber and the speed is 300 rpm. At what speed must the armature be driven to generate an e.m.f of 250 volts if the flux per pole is reduced to 0.05 webers? [8+8]

8. (a) Explain the principle of operation of the polyphase induction motor.

   (b) Differentiate the slip ring induction motor and squirrel cage induction motor. [8+8]

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

II B.Tech I Semester Examinations,May/June 2012
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 principle of operation of the polyphase induction motor.
   (b) Differentiate the slip ring induction motor and squirrel cage induction motor. [8+8]

2. (a) What is the need of a starter for DC motors? Can we use the same starter for the equally rated DC shunt and series motors? If not, explain clearly about it?
   (b) A 25 kW, 250 volt, DC shunt generator has armature and field resistances of 0.05 ohms and 100 ohms respectively. Determine the power developed by the armature when the machine is working as a generator delivering 25 kW output and as a motor taking 25 kW. [8+8]

3. (a) State the logic supporting the Kirchhoff's Laws of Electrical Circuit?
   (b) A coil has a resistance of 22 ohms when its mean temperature is 20 degree centigrade and 26 ohms when its mean temperature is 70 degree centigrade. Find its mean temperature rise, when its resistance is 28 ohms and the ambient temperature is 15 degree centigrade. [8+8]

4. From the following test results, determine the voltage regulation of a 2000V, 3-ϕ alternator delivering a current of 100 A at
   (a) unity powerfactor
   (b) 0.8 leading powerfactor
   (c) 0.71 lagging powerfactor
   Test results: full load current of 100 A is produced on short circuit by a field excitation of 2.5 A. An emf of 500 V is produced on open circuit by the same excitation. The armature resistance is 0.8 Ω. [16]

5. Describe the ammeter shunts with neat diagram, giving their constructional details. [16]

6. (a) What is meant by phase and phase difference?
   (b) A choke coil takes a current of 2 amperes lagging 60 degrees behind the applied voltage of 230 volts at 50 Hz. Calculate the inductance and resistance of the coil.
   (c) Define the terms:
      i. Active power

ii. Reactive power. [6+6+4]

7. A 50 KVA, single phase transformer has an iron loss of 400W and full load copper loss of 800W.

   (a) find the load at which maximum efficiency occurs and the value of maximum efficiency at unity power factor.

   (b) if the maximum efficiency occurs at 80% of full load, find the new core loss and full load copper loss assuming that total full load loss is constant. [16]

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   (b) The armature of a 6 pole DC generator has wave winding containing 664 conductors. Calculate the generated e.m.f when flux per pole is 0.06 weber and the speed is 300 rpm. At what speed must the armature be driven to generate an e.m.f of 250 volts if the flux per pole is reduced to 0.05 webers? [8+8]

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