Code No: R05220204 **R05** **Set No. 2**

II B.Tech II Semester Examinations,December 2010
ELECTRICAL MACHINES-II
Electrical And Electronics Engineering

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

Answer any FIVE Questions
All Questions carry equal marks

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1. (a) A 3-Φ, 4 pole, 50 Hz, IM runs with 4% slip at full load. What will be the frequency of current induced in the rotor at starting and at full load?
   (b) What will happen if one of the end rings of a squirrel cage rotor got open circuited. Give the complete analysis. [8+8]
2. (a) Draw the vector diagrams of transformer at load with lagging & leading power factors.
   (b) Calculate the voltage regulation for a 200/400 V, 4 kVA transformer at full load & pf. 0.8 lagging with following test data:
   OC test: 200 V, 0.8 A, 70 W (LV side)
   SC test: 20 V, 10 A, 60 W (HV side) [8+8]
3. (a) What is the efficiency of transformer? How the efficiency of transformer can be calculated?
   (b) The turn's ratio of a single phase transformer is 4. The resistance & leakage reactance of HV windings are 1.4 Ω & 1.6 Ω respectively and that of LV windings are 0.06 Ω & 0.08 Ω respectively. If 200 V is applied to HV winding & LV winding is short circuited, find the current supplied by the source. (Neglect magnetising current). [8+8]
4. (a) Explain the slip power recovery technique for speed control of 3-Φ IM.
   (b) Two 50 Hz, 3-Φ IM having 6 & 4 poles respectively are connected in cumulative cascade of which the 6 pole motor is connected to mains supply. Calculate the rotor frequency & and slip of each motor referred to respective stator fields if the set has a slip of 3%. [8+8]
5. (a) With neat phasor diagram, explain the voltage regulation of three-phase transformer.
   (b) An ideal 3-Φ step down transformer connected in delta/star delivers power to a balanced 3-Φ load of 120 kVA at 0.8 pf. The input line voltage is 11 kV and the turn's ratio of transformer (phase to phase) is 10. Determine the line voltage line currents, phase voltages, phase currents on both primary & secondary sides. [8+8]
6. A 3-Φ, Δ connected, 20 HP, 440 V, 6-pole, 50 Hz IM gave the following test results:
   No load Test: 440 V, 10 A, PF = 0.2
   Blocked rotor test: 200 V, 50 A, PF = 0.4
   All above are the line values. Plot the circle diagram and for full load find:

(a) The line current
(b) The power factor
(c) Slip
(d) Torque
(e) Efficiency
(f) Maximum Power factor

Given that rotor copper losses are equal to stator copper losses at stand still. [16]

7. (a) Explain the T/S characteristics of 3-Φ double cage IM.
   (b) A 40 kW, 400 V, 3-Φ, 6 pole, 50 Hz, wound rotor, IM develops a maximum torque of 2.75 times full load torque at a slip of 0.18 when operating at rated voltage and frequency with slip rings short circuited. Stator resistance and rotational losses may be ignored. Determine: The full load slip, the full load rotor copper loss, the starting torque at half the rated voltage. The rotor circuit is now doubled by adding an external resistance through the slip rings, determine: the developed torque at full load current and the corresponding slip. [4+12]

8. (a) With neat phaser diagram explain the operation of transformer with resistive load.
   (b) A single phase transformer with a primary (HV) voltage of 1600 V with a ratio of 8:1. The transformer supplies a load of 20 kW at a pf of 0.8 lagging and takes a no-load current of 2 A at pf of 0.2, estimate the current taken by the primary. [8+8]

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Code No: R05220204 **R05** **Set No. 4**

II B.Tech II Semester Examinations,December 2010
ELECTRICAL MACHINES-II
Electrical And Electronics Engineering

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

Answer any FIVE Questions
All Questions carry equal marks

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   No load Test: 440 V, 10 A, PF = 0.2
   Blocked rotor test: 200 V, 50 A, PF = 0.4
   All above are the line values. Plot the circle diagram and for full load find:
   (a) The line current
   (b) The power factor
   (c) Slip
   (d) Torque
   (e) Efficiency
   (f) Maximum Power factor
   Given that rotor copper losses are equal to stator copper losses at stand still. [16]
2. (a) With neat phaser diagram explain the operation of transformer with resistive load.
   (b) A single phase transformer with a primary (HV) voltage of 1600 V with a ratio of 8:1. The transformer supplies a load of 20 kW at a pf of 0.8 lagging and takes a no-load current of 2 A at pf of 0.2, estimate the current taken by the primary. [8+8]
3. (a) Draw the vector diagrams of transformer at load with lagging & leading power factors.
   (b) Calculate the voltage regulation for a 200/400 V, 4 kVA transformer at full load & pf. 0.8 lagging with following test data:
   OC test: 200 V, 0.8 A, 70 W (LV side)
   SC test: 20 V, 10 A, 60 W (HV side) [8+8]
4. (a) Explain the slip power recovery technique for speed control of 3-Φ IM.
   (b) Two 50 Hz, 3-Φ IM having 6 & 4 poles respectively are connected in cumulative cascade of which the 6 pole motor is connected to mains supply. Calculate the rotor frequency & and slip of each motor referred to respective stator fields if the set has a slip of 3%. [8+8]
5. (a) What is the efficiency of transformer? How the efficiency of transformer can be calculated?

(b) The turn's ratio of a single phase transformer is 4. The resistance & leakage reactance of HV windings are 1.4 Ω & 1.6 Ω respectively and that of LV windings are 0.06 Ω & 0.08 Ω respectively. If 200 V is applied to HV winding & LV winding is short circuited, find the current supplied by the source. (Neglect magnetising current). [8+8]

6. (a) With neat phasor diagram, explain the voltage regulation of three-phase transformer.

   (b) An ideal 3-Φ step down transformer connected in delta/star delivers power to a balanced 3-Φ load of 120 kVA at 0.8 pf. The input line voltage is 11 kV and the turn's ratio of transformer (phase to phase) is 10. Determine the line voltage line currents, phase voltages, phase currents on both primary & secondary sides. [8+8]

7. (a) A 3-Φ, 4 pole, 50 Hz, IM runs with 4% slip at full load. What will be the frequency of current induced in the rotor at starting and at full load?

   (b) What will happen if one of the end rings of a squirrel cage rotor got open circuited. Give the complete analysis. [8+8]

8. (a) Explain the T/S characteristics of 3-Φ double cage IM.

   (b) A 40 kW, 400 V, 3-Φ, 6 pole, 50 Hz, wound rotor, IM develops a maximum torque of 2.75 times full load torque at a slip of 0.18 when operating at rated voltage and frequency with slip rings short circuited. Stator resistance and rotational losses may be ignored. Determine: The full load slip, the full load rotor copper loss, the starting torque at half the rated voltage. The rotor circuit is now doubled by adding an external resistance through the slip rings, determine: the developed torque at full load current and the corresponding slip. [4+12]

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Code No: R05220204 **R05** **Set No. 1**

II B.Tech II Semester Examinations,December 2010
ELECTRICAL MACHINES-II
Electrical And Electronics Engineering

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

Answer any FIVE Questions
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1. (a) What is the efficiency of transformer? How the efficiency of transformer can be calculated?
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   No load Test: 440 V, 10 A, PF = 0.2
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   All above are the line values. Plot the circle diagram and for full load find:
   (a) The line current
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   Given that rotor copper losses are equal to stator copper losses at stand still. [16]

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6. (a) With neat phasor diagram, explain the voltage regulation of three-phase transformer.

(b) An ideal 3-Φ step down transformer connected in delta/star delivers power to a balanced 3-Φ load of 120 kVA at 0.8 pf. The input line voltage is 11 kV and the turn's ratio of transformer (phase to phase) is 10. Determine the line voltage line currents, phase voltages, phase currents on both primary & secondary sides. [8+8]

7. (a) With neat phaser diagram explain the operation of transformer with resistive load.

(b) A single phase transformer with a primary (HV) voltage of 1600 V with a ratio of 8:1. The transformer supplies a load of 20 kW at a pf of 0.8 lagging and takes a no-load current of 2 A at pf of 0.2, estimate the current taken by the primary. [8+8]

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Code No: R05220204 **R05** **Set No. 3**

II B.Tech II Semester Examinations,December 2010
ELECTRICAL MACHINES-II
Electrical And Electronics Engineering

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

Answer any FIVE Questions
All Questions carry equal marks

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   No load Test: 440 V, 10 A, PF = 0.2
   Blocked rotor test: 200 V, 50 A, PF = 0.4
   All above are the line values. Plot the circle diagram and for full load find:
   (a) The line current
   (b) The power factor
   (c) Slip
   (d) Torque
   (e) Efficiency
   (f) Maximum Power factor

   Given that rotor copper losses are equal to stator copper losses at stand still. [16]

Code No: R05220204 **R05** **Set No. 3**

5. (a) With neat phasor diagram, explain the voltage regulation of three-phase transformer.

   (b) An ideal 3-Φ step down transformer connected in delta/star delivers power to a balanced 3-Φ load of 120 kVA at 0.8 pf. The input line voltage is 11 kV and the turn's ratio of transformer (phase to phase) is 10. Determine the line voltage line currents, phase voltages, phase currents on both primary & secondary sides. [8+8]

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