Code: R7220205 R07

B.Tech II Year II Semester (R07) Supplementary Examinations December/January 2015/2016

ELECTRICAL MACHINES - II

(Electrical & Electronics Engineering)

(For 2008 regular admitted batch only)

Time: 3 hours Max. Marks: 80

Answer any FIVE questions

All questions carry equal marks

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1 (a) Explain the working principle and operation of transformer.
(b) The voltage ratio of a single-phase, 50 Hz, transformer is 5000/500 V at no load. Calculate the number of turns in each winding if the maximum flux in the core is 7.82 mWb.

2 (a) Obtain the condition for zero voltage regulation & maximum voltage regulation of transformer.
(b) The efficiency of a 250 kVA single phase transformer is 96 % at full load, 0.8 pf lagging & 97.2 % at half full load, unity pf. Determine the efficiency of transformer at $3/4^{th}$ load with 0.8 lagging pf.

3 (a) Explain the test procedure to separate the iron losses of a transformer with neat circuit diagram, Tabulation and Model graph.
(b) Explain equivalent circuit of an auto-transformer and also explain how it differs from two winding transformer.

4 Give different types of poly phase connections of a transformer. Also give the relationships between phase and line quantities.

5 (a) With a neat sketch explain the construction of squirrel cage induction motor.
(b) Calculate the speed in RPM and RPS for a 6 pole induction motor which has a slip of 6% at full load with a supply frequency of 50 Hz. What will be the speed of a 4 pole alternator supplying power to this motor?

6 (a) Explain various losses taking place in Induction Motors.
(b) A 4-pole, 3-phase, 50 Hz, Induction Motor supplies a useful torque of 160 Nm at 5 % slip. Calculate: (i) Rotor input. (ii) Motor input. (iii) Efficiency if friction & windage losses are 500 W and stator losses are 1000 W.

7 (a) Explain the procedure to calculate starting current in an induction motor and its dependence on rotor slip.
(b) A 10-pole, 3-phase, 50 Hz induction motor draws 2.5 A and 100 kW under the block rotor test. Find the starting torque when switched on direct to rated voltage and frequency supply. Assume the stator and rotor copper losses to be equal under the blocked rotor test.

8 (a) Explain the speed control of induction motor by rotor rheostat control and injecting e.m.f in the rotor side.
(b) The rotor of 3-phase slip ring induction motor has an induced voltage of 100 V and impedance of 0.2 + j1 ohm at stand still. The induction motor has full load slip of 0.04 driving constant torque load and running at 1440 rpm. Calculate the voltage to be injected if the motor is to be driven at 800 rpm.

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