Code: 9A02407 R09

B.Tech II Year II Semester (R09) Supplementary Examinations December/January 2014/2015

ELECTRICAL MACHINES - II

(Electrical & Electronics Engineering)

Time: 3 hours Max. Marks: 70

Answer any FIVE questions

All questions carry equal marks

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1 (a) Compare between core type and shell type transformers.
(b) Derive the emf equation of a 1-phase transformer and calculate the emf / turn, if the flux is 0.015 Wb at a frequency of 50 Hz.

2 (a) Develop the equivalent circuit of a single-phase transformer.
(b) A 200 kVA, 1- phase, 3300 / 400 V transformer gave the following results in the short circuit test with 200 V applied to the primary and secondary short circuited, the primary current was full load value and the input power was 1650 W. Calculate the secondary potential difference and the % of regulation when the full load current was passing at a 0.707 p. f. lagging with normal primary voltage.

3 (a) Explain the O.C. and S.C. tests on the transformer and hence explain the evaluation of equivalent circuit from it.
(b) Explain the operation of autotransformer with neat diagram.

4 (a) With neat phasor diagram, explain the voltage regulation of three-phase transformer.
(b) An ideal 3-phase step down transformer connected in delta/star delivers power to a balanced 3-phase 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.

5 Describe briefly the working principle of slip ring induction motor. Explain how its speed control is effected?

6 (a) A 4 pole, 400 V, 3-IM has a standstill rotor EMF of 100 V per phase. The rotor has resistance of 50 m/ph and standstill reactance of 0.5 /ph. Calculate the maximum torque & slip at which it occurs. Neglect stator impedance.
(b) Explain the various losses taking place in IM. Explain the effect of slip on the performance of IM.

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 about the speed control of induction motor by cascade operation.
(b) Two 50 Hz 3-Φ induction motor having 6 & 4 poles respectively are cumulatively cascaded. The 6 pole motor being connected to the main supply. Determine frequencies of rotor currents and the slips referred to each stator field. If the set has slip of 2%.

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