

Code: 9A02407

B.Tech II Year II Semester (R09) Supplementary Examinations May/June 2017

ELECTRICAL MACHINES – II
(Electrical & Electronics Engineering)

Time: 3 hours

Max. Marks: 70

Answer any FIVE questions
All questions carry equal marks

- 1 (a) What is an ideal transformer? Draw its no load phasor diagram.
(b) The primary winding of a 50 Hz single phase transformer has 480 turns and is fed from 6400 V supply. The secondary winding has 20 turns. Find the peak value of flux in the core and the secondary voltage.
- 2 (a) Obtain the equivalent circuit of a single-phase transformer. Explain how to evaluate the equivalent circuit of a transformer from open circuit & short circuit tests.
(b) A 5 kVA, 220/110 volts, 1-phase transformer has a maximum efficiency of 96.97% at 0.8 p.f. lagging. It has a core loss of 50 watts and the full load regulation at 0.8 p.f lagging is 5%. Find the efficiency and regulation at full load 0.9 p.f lagging.
- 3 (a) Explain the procedure for OC test of transformer.
(b) A single phase transformer has the following data: Turns ratio 10:1, $Z_1 = 1.6 + j4.3$, $Z_2 = 0.019 + j0.048$. The input voltage of the transformer is 5000 V and the load current at the secondary is 250 A at 0.8 p.f lagging. Neglecting no load current, calculate secondary terminal voltage and output power.
- 4 Describe briefly the construction of a three phase transformer.
- 5 Describe the principle of an induction motor. Describe the differences in construction between a squirrel cage induction motor and slip ring induction motor.
- 6 (a) Describe torque slip characteristics of an induction motor.
(b) An 8-pole, 3-phase, 50 Hz induction motor runs at a speed of 710 r.p.m with an input power of 35 kW. The stator copper loss at this operating condition is 1200 W while the rotational losses are 600 W. Find: (i) Rotor copper loss.
(ii) Gross torque developed.
(iii) Gross mechanical power developed.
(iv) Net torque and mechanical power output.
- 7 (a) Explain in detail about the working of rotor rheostat starter with a suitable diagram.
(b) Explain the tests to be carried out to draw circle diagram of an induction motor.
- 8 (a) Explain about the speed control of induction motor by cascade operation.
(b) Two 50 Hz, 3- Φ induction motors 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%.
