

Seat No.: _____

Enrolment No. _____

GUJARAT TECHNOLOGICAL UNIVERSITY

B. E. - SEMESTER – III • EXAMINATION – WINTER 2012

Subject code: 131701

Date: 05-01-2013

Subject Name: Electrical Machine

Time: 10.30 am – 01.00 pm

Total Marks: 70

Instructions:

1. Attempt all questions.
2. Make suitable assumptions wherever necessary.
3. Figures to the right indicate full marks.

- Q.1** (a) What is commutation? Give remedies for commutation. 07
(b) Write advantages and applications of auto transformer. 07

- Q.2** (a) Explain the phenomena of armature reaction of a DC machine. State its remedies. 07
(b) What is slip of a 3-phase induction motor? Discuss its slip- torque characteristics. 07
OR
(b) Write and explain the conditions of parallel operation of 3-phase transformer. 07

- Q.3** (a) Draw and explain the equivalent circuit of single phase transformer. 07
(b) A 25 KVA transformer has 500 turns on the primary and 50 turns on the secondary winding. The primary is connected to 3000 V, 50 Hz supply. Find the full load primary and secondary currents, the secondary e.m.f. and the maximum flux in the core. Neglect leakage drops and no load primary current. 07

OR

- Q.3** (a) Explain how the torque is developed in a 3-phase induction motor. Derive the equation of torque under running condition. 07
(b) A 30 KVA, 2400/120 V, 50 Hz transformer has a high voltage winding resistance of 0.1 ohm and a leakage reactance of 0.22 ohm. The low voltage winding resistance is 0.035 ohm and leakage reactance is 0.012 ohm . find the equivalent winding resistance, reactance and impedance referred to the (i) high voltage side (ii) low voltage side. 07

- Q.4** (a) How three phase to two phase transformation of transformer is obtained? 07
(b) Explain the Swinburne's test of a d.c. machine for finding losses with necessary diagram. 07

OR

- Q.4** (a) Explain different methods for speed control of series motors. 07
(b) Write different starters used for 3 phase induction motor and explain any one of them. 07

- Q.5** (a) What is synchronizing of an alternator? Explain any one method for Synchronizing. 07
(b) Differentiate between singly excited and multi-excited field systems. Derive the expression for the mechanical force in a current excited system. 07

OR

- Q.5** (a) Define and state the expressions for (i) Pitch factor. (ii) Distribution factor for alternator. 07
(b) What is voltage regulation? How it can be determined by using Zero power factor method in synchronous machine? 07
