Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

BE SEMESTER– III EXAMINATION – SUMMER 2015

Subject Code:131701 **Date:29/05/2015**

Subject Name: Electrical Machines

Time: 02.30pm-05.00pm **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) Explain the construction features and working principle of single phase transformer. 7

(b) Explain the construction and types of three phase induction motor. 7

Q.2 (a) Discuss the types of d.c. motors. What is the difference between d.c. generator and d.c. motor. 7

(b) Explain the characteristics of d.c. motors. 7

OR

(b) A 120 V dc shunt motor has an armature resistance of 0.2 Ω and a field resistance of 60 Ω. It runs at 1800 rpm taking a full load current of 40 A. Find the speed on half load condition. 7

Q.3 (a) Write the main parts of d.c. generator. Also write its function. 7

(b) A 250 V dc shunt motor takes a line current of 20 A. Resistance of shunt field winding is 200 Ω and resistance of the armature is 0.3 Ω. Find the armature current and the back emf. 7

OR

Q.3 (a) Explain construction and working principle of synchronous generator. 7

(b) Discuss salient pole and non salient pole synchronous generator. 7

Q.4 (a) Explain the equivalent circuit of 1-phase transformer. 7

(b) The no load current of a transformer is 10 A at a power factor of 0.25 lagging, when Connected to 400 V, 50 Hz supply. Calculate: 7

(i) Magnetizing component of no load current (ii) Iron loss (iii) Max. value of flu in the core. Assume primary winding turns as 500.

OR

Q.4 (a) Derive emf equation of transformer. Explain auto transformer with its applications. 7

(b) Explain the losses of transformer. How these losses are reduce? 7

Q.5 (a) Explain the operating principle of a 3-phase induction motor. What is slip? 7

(b) A 4 pole, 3-phase 50 Hz induction motor runs at speed of 1470 rpm. Find the frequeny of the induced emf in the rotor under this condition. 7

OR

Q.5 (a) Why single phase induction motor is not self start? How it is made self start? 7

(b) Explain no load and blocked rotor test of 1-phase induction motor. 7

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