

**GUJARAT TECHNOLOGICAL UNIVERSITY**  
**PDDC - SEMESTER-II EXAMINATION – SUMMER 2016**

**Subject Code: X20903****Date: 04/06/2016****Subject Name: ELECTRICAL MACHINES I & II****Time: 10:30 AM to 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) Derive the EMF equation of a DC generator from first principles. **07**  
(b) Enlist the parts of a DC machine and explain the construction and function of any two parts in detail. **07**

- Q.2** (a) Derive the torque equation of a three phase induction motor. Draw the torque-speed characteristic for the motor. **07**  
(b) Explain slip of an induction motor. What is the significance of slip in relation to the performance parameters of the motor? **07**

**OR**

- (b) Briefly describe the construction of a salient pole type synchronous generator. **07**

- Q.3** (a) Explain the term rotating magnetic field. How the rotating field is established in a three phase induction motor? **07**  
(b) Define voltage regulation of a synchronous generator. Describe the method to find out voltage regulation by synchronous impedance method. **07**

**OR**

- Q.3** (a) Mention various methods of measurement of slip of an induction motor. Explain any one of them in detail. **07**  
(b) Explain the procedure to find out voltage regulation of an alternator by MMF method. **07**

- Q.4** (a) Explain the speed control of DC shunt motor using field control method. **07**  
(b) Why starter is required for a DC motor? Draw the schematic diagram and explain three point starter for a DC shunt motor. **07**

**OR**

- Q.4** (a) Draw the circuit and explain Ward-Leonard method of speed control. **07**  
(b) Enlist the types of DC motors. Describe the difference between the characteristics of a shunt motor and a series motor. **07**

- Q.5** (a) Briefly describe the construction of a single phase shell type transformer. **07**  
(b) Draw and explain the vector diagram of a transformer. **07**

**OR**

- Q.5** (a) Explain the indirect load tests to find out efficiency of a single phase transformer. **07**  
(b) Draw and explain the equivalent circuit of a single phase transformer. **07**