

Seat No.: _____

Enrolment No. _____

GUJARAT TECHNOLOGICAL UNIVERSITY
PDDC - SEMESTER-VI • EXAMINATION – SUMMER • 2015

Subject code: X 60901

Date: 08/05/2015

Subject Name: Electrical Machine - III

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) Explain the field's test for D.C. series machines. **07**
(b) What are the advantages of connecting alternators in parallel? Draw circuit diagram for one dark and two bright lamp method. **07**
- Q.2** (a) Explain an experimental method of determining 'V' curves for a synchronous motor. **07**
(b) When running on no-load, a 400-V shunt motor takes 5 A. Armature resistance is 0.5Ω and field resistance 200Ω . Find the output of the motor and efficiency when running on full load and taking a current of 50 A. Also, find the percentage change in speed from no-load to full load. **07**
- OR**
- (b) In a Hopkinson's test on a pair of 500-V, 100-kW shunt generators, the following data was obtained : **07**
Auxiliary supply, 30 A at 500 V : Generator output current, 200 A
Field currents, 3.5 A and 1.8 A
Armature circuit resistances, 0.075Ω each machine. Voltage drop at brushes, 2 V (each machine).
Calculate the efficiency of the machine acting as a generator.
- Q.3** (a) Describe slip test for determining X_d and X_q of salient pole synchronous machine. Draw circuit diagram. **07**
(b) Derive the expression for the input and output power developed by synchronous motor. Also derive the maximum input and output power developed by synchronous motor. **07**
- OR**
- Q.3** (a) Explain circle diagram of auto synchronous motor. **07**
(b) Why synchronous motor is not self-starting? Explain the methods of starting of Synchronous motor. **07**
- Q.4** (a) List different methods for finding voltage regulation of an alternator and explain ZPF method. **07**
(b) Explain Armature reaction and its effects at different power factor in alternator with Phasor Diagram. **07**
- OR**
- Q.4** (a) List the advantages of stationary armature in synchronous machines. **07**
(b) Explain BLDC motor with its application and advantages. **07**
- Q.5** (a) Explain single phase induction regulator. **07**
(b) Explain the operation of AC servo motor. **07**
- OR**
- Q.5** (a) Explain construction and working principle of hysteresis motor. **07**
(b) Explain construction, working and applications of switched reluctance motor. **07**
