

Seat No.: _____

Enrolment No. _____

GUJARAT TECHNOLOGICAL UNIVERSITY

Diploma Engineering - SEMESTER-IV • EXAMINATION – SUMMER • 2014

Subject Code: 3340901

Date: 23-05-2014

Subject Name: Polyphase Transformer and Rotating AC Machines

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.
4. English version is considered to be Authentic.

- Q.1** (a) Draw and explain the equivalent circuit and phasor diagram of an Alternator with R and R-L loads. **07**
- (b) Explain the synchronous impedance method of voltage regulation of an Alternator by performing O.C and S.C tests. **07**
- Q.2** (a) Why Synchronous Motor is not self-starting? Explain any one method of starting. **07**
- (b) Derive the Emf equation of an Alternator. **07**
- OR
- (b) Explain two bright and one dark lamp method of determining synchronization of Alternators. **07**
- Q.3** (a) Draw and explain the working of a manual star-delta starter used for 3-phase induction motor. **07**
- (b) Explain the effect of excitation on armature current and p.f. in Synchronous Motor. **07**
- OR
- Q.3** (a) State different methods of speed control of 3-phase induction motor. Explain in brief any two methods. **07**
- (b) Draw and explain vector diagram of synchronous motor on no-load, light-load and heavy-load conditions. **07**
- Q.4** (a) Compare 3-phase squirrel cage induction motor with 3-phase slip ring induction motor. **07**
- (b) The power input to 400 V, 60 Hz, 6 poles 3- Φ I.M. running at 1140 RPM is 40 KW at 0.8 p.f. lagging. If stator losses are 1 KW and mechanical losses are 2 KW. Find a) Slip, b) Rotor Cu. Loss and c) Efficiency. **07**
- OR
- Q.4** (a) Describe the working of shaded pole single phase Induction Motor. **07**
- (b) State the role of centrifugal switch used in Induction motor and state the working of motor used in ceiling fan. **07**
- Q.5** (a) 1. What are the conditions for parallel operation of two 3- Φ transformers. **07**
2. Explain the function of conservator tank, buchholz relay and breather used in transformers
- (b) Draw connection and vector diagram of Yd_1 , Dy_{11} and Yy_6 3- Φ transformers. **07**
- OR
- Q.5** (a) How rotating magnetic field is produced in three phase Induction Motor. **07**
- (b) The resistance and reactance of a 400 V, 3- Φ , star connected Synchronous motor are 0.25 Ω and 3.2 Ω respectively. Calculate the power input and back emf when motor takes 25 A at 0.8 p.f. lagging. **07**