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 lasses 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. 2. Explain the function of conservator tank, buchholz relay and breather used in transformers	**07**
	(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**