Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

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

Subject Code: 3340901 Date: 26-11-2014

Subject Name: Polyphase Transformer and Rotating AC Machines

Time: 02:30 pm - 05:00 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 Answer any seven out of ten. **14**

1. Why 1-ø induction motor is not self starting?
2. Define synchronous speed and slip.
3. Explain function of starter.
4. Why armature winding is kept in stator in case of alternator?
5. State various losses found in I.M.
6. State the factors affecting the value of generated E.M.F of Alternator.
7. State the conditions for synchronization of 3 phase alternator with infinite busbar.
8. State types of alternator according to rotor construction.
9. What is V-curve?
10. What is the role of centrifugal switch in case of single phase motor?

Q.2 (a) What are the conditions for parallel operation of two 3-Ø transformers? **03**

OR

(a) Draw connection diagram of Yy_0, and Yy_6 3-Ø transformers. **03**

(b) Write down various cooling methods available for 3-Ø transformers. **03**

OR

(b) Compare a bank of 3 single phase transformer with a single 3-Ø transformer. **03**

(c) Name the accessories of 3 phase transformer and explain function of Breather. **04**

OR

(c) Draw the sketch of Buchholz Relay and explain its working. **04**

(d) Describe the construction and working of a shaded pole Induction motor. **04**

OR

(d) List the methods of starting of 1-ø induction motor and explain working of ceiling fan induction motor. **04**

Q.3 (a) Compare between Slip ring and Squirrel cage Induction Motor. **03**

OR

(a) Write short note on Torque – Slip characteristics of 3-Ø I.M. **03**

(b) State different methods of speed control of polyphone induction motor. **03**

OR

(b) Why starter is required to start three phase Induction motor? State the different types of starter used. **03**

(c) Explain D.O.L. starter for polyphase induction motor. **04**

OR

(c) If a 3-Ø I.M. with 6 poles runs at 970 rpm when connected to a 50 Hz supply, calculate (a) % slip, and (b) frequency of rotor current. **04**

(d) Draw and explain Vector diagram of synchronous motor on load. **04**

OR

(d) Derive the equation of starting torque for 3-ø induction motor and obtain condition of maximum starting torque from it. **04**

Q.4	(a)	Derive the E.m.f. equation of an Alternator.	**03**
		OR	
	(a)	Explain method of starting of synchronous motor using damper winding.	**03**
	(b)	Explain the effect of excitation on armature current and power factor for synchronous motor.	**04**
		OR	
	(b)	Explain any one of method for synchronization of 3 phase alternator with infinite busbar.	**04**
	(c)	Explain the synchronous impedance method of voltage regulation of an Alternator by performing O.C and S.C tests.	**07**
Q.5	(a)	Why Synchronous Motor is not self-starting?	**04**
	(b)	Describe the working of 3-phase SCIM with circuit diagram.	**04**
	(c)	Draw the equivalent circuit of polyphase induction motor.	**03**
	(d)	State the application of single phase induction motors.	**03**

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