Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER–IV (NEW) EXAMINATION – WINTER 2017

Subject Code: 2140906 **Date:17/11/2017**

Subject Name: AC Machines

Time: 02:30 PM TO 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.**

			MARKS
Q.1*	**(a)**	Derive emf equation of an alternator.	**03**
	(b)	Explain with reason why synchronous motor is not self starting?	**04**
	(c)	What is slip? Draw and explain torque slip curve of an Induction Motor.	**07**
Q.2	**(a)**	Explain cogging and crawling.	**03**
	(b)	Compare squirrel cage and slip ring Induction Motor	**04**
	(c)	Derive the equation of electromagnetic torque for a three phase induction motor with usual notations from first principle.	**07**
		OR	
	(c)	A 100 KW(output),3300 V,50 Hz, 3 phase star connected induction motor has a synchronous speed of 500 r.p.m. The full load slip is 1.8% and F. L. power factor is 0.85. Stator copper loss=2440 W, Iron loss=3500 W, Rotational loss=1200 W. Calculate (i) the rotor copper loss (ii) the line current (iii) the full load efficiency.	**07**
Q.3	**(a)**	Explain star delta starter for 3 phase induction motor.	**03**
	(b)	List out the methods of speed control of Induction Motor. Explain any one in detail.	**04**
	(c)	Draw the schematic diagram and explain the construction and working of shaded pole single phase motor.	**07**
		OR	
Q.3	**(a)**	Define pitch factor and distribution factor.	**03**
	(b)	Explain any one method to find the voltage regulation of an alternator,	**04**
	(c)	Explain procedure to construct circle diagram for 3 phase induction motor.	**07**
Q.4	**(a)**	State the conditions to be satisfied for putting a 3 phase alternator in parallel with infinite bus.	**03**
	(b)	A 1200 KVA, 6600 V, 3 phase star connected alternator has its armature resistance as 0.25 Ω per phase and its synchronous reactance as 5 Ω per phase. Calculate its regulation if it delivers full load at (i)0.8 power factor lagging and (ii) 0.8 power factor leading.	**04**
	(c)	Discuss the effect of armature reaction in an alternator.	**07**
		OR	
Q.4	**(a)**	Discuss the methods of starting the synchronous motor.	**03**
	(b)	Briefly explain V-curves of synchronous motor	**04**
	(c)	What is synchronization? Explain two bright one dark lamp method of synchronization.	**07**
Q.5	**(a)**	What do you mean by auto synchronous motor	**03**

	(b)	Explain the construction and working of universal motor	**04**
	(c)	Why single phase induction motors are not self started? Explain double field revolving theory for single phase induction motor.	**07**

OR

Q.5	**(a)**	What is hunting? How to minimize it?	**03**
	(b)	Explain working principle of Induction Generator	**04**
	(c)	What is the role of commutator In AC commutator motor? Explain the working of Schrage motor.	**07**

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