Seat No.: _____ **Enrolment No._____**

GUJARAT TECHNOLOGICAL UNIVERSITY

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

Subject Code: 2140906 **Date: 03/06/2017**

Subject Name: AC Machines

Time: 10:30 AM to 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.**

			MARKS
Q.1		**Short Questions**	**14**
	1	The principle of operation of a 3 phase Induction Motor is most similar to that of a (a)Synchronous motor (b)repulsion start Induction Motor (c)Transformer with shorted secondary (d)Capacitor start Induction run motor	
	2	One of the characteristic of a single phase motor is that it (a)is self starting (b)is not self starting (c)requires only one winding (d)can rotate in one direction only	
	3	The wound rotor Induction Motor is mainly used due to (a)high starting torque (b)speed control (c)High rotor resistance (d)none of these	
	4	A 4 pole, 440 V,50 Hz Induction Motor is running at a slip of 4 %.The speed of motor is (a)1260 rpm (b)1440 rpm (c)1500 rpm (d)1560 rpm	
	5	For getting maximum torque at start_____ is true. (a) rotor resistance is equal to rotor reactance at standstill. (b) rotor resistance is less than the rotor reactance at standstill. (c) rotor resistance is greater than the rotor reactance at standstill. (d) rotor resistance must be zero.	
	6	_____starter reduces the starting current by the factor $1/\sqrt{3}$. (a)stator resistance (b)star delta (c)direct on line (d) Auto transformer	
	7	In turbo alternators _____rotor is used. (a)smooth cylindrical (b)salient pole (c)projected type (d)brushless	
	8	Why damper winding is used in synchronous machine?	
	9	What is the frequency of voltage generated by an alternator having 4 poles and rotating at 1800 rpm?	
	10	State the characteristics of synchronous motor.	

	11	Why is a single phase induction Motor not self starting?	
	12	Define voltage regulation of an alternator.	
	13	What are the effects of armature reaction in alternator?	
	14	State the applications of synchronous motor.	
Q.2	**(a)**	Compare squirrel cage and slip ring Induction Motor.	**03**
	(b)	Explain cogging and crawling in 3 phase Induction Motor with their remedies.	**04**
	(c)	What is slip? Explain torque slip curve of an Induction Motor.	**07**
		OR	
	(c)	Explain principle of operation of 3 phase Induction Motor	**07**
Q.3	**(a)**	Derive the torque equation for 3phase Induction Motor.	**03**
	(b)	List out the methods of speed control of Induction Motor. Explain any one in detail.	**04**
	(c)	The power input to a 500 V, 50 Hz, 6 Pole, 3 phase Induction Motor running at 975 rpm is 40 KW. The stator losses are 1 KW and the friction and windage losses total 2 KW. Calculate (i) the slip (ii) the rotor copper loss (iii) shaft power and (iv) the efficiency.	**07**
		OR	
Q.3	**(a)**	Explain double field revolving theory for single phase Induction Motor.	**03**
	(b)	Mention types of starters for 3 phase Induction Motor. Explain any one in detail.	**04**
	(c)	Explain working principle with necessary diagrams of any two single phase Induction Motor.	**07**
Q.4	**(a)**	Derive emf equation of an alternator.	**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)	List the methods of determination of voltage regulation of an alternator. Explain any one in detail.	**07**
		OR	
Q.4	**(a)**	State the conditions to be satisfied for putting a 3 phase alternator in parallel with infinite bus.	**03**
	(b)	Discuss the methods of starting of synchronous motor.	**04**
	(c)	What is synchronization? Explain two bright and one dark lamp method of synchronization of 3 phase alternators.	**07**
Q.5	**(a)**	What is hunting? How to minimize it?	**03**
	(b)	Explain the determination of direct axis and quadrature axis synchronous reactance using slip test.	**04**
	(c)	Draw and explain experimental set up to obtain V curves of Synchronous Motor.	**07**
		OR	
Q.5	**(a)**	Write a short note on auto synchronous motor.	**03**
	(b)	Explain working principle of Induction Generator.	**04**
	(c)	What is the role of commutator in A.C. commutator motor? Explain working of Schrage Motor.	**07**

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