Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER–IV(New) EXAMINATION – SUMMER 2016

Subject Code:2140906 **Date:01/06/2016**

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	In a 3-phase induction motor, the rotor field rotates at synchronous speed with respect to (a) stator (b) rotor (c) stator flux (d) none of the above.	
2	In capacitor motors, the capacitor is connected in ..... with the starting winding. (a)Series (b)Parallel	
3	A shaded pole type motor is generally not used because it has poor ..... (a) Starting Torque (b)Running Torque (c) Speed (d) starting current	
4	The efficiency of a 3-phase induction motor is approximately proportional to (a) (1. s) (b) s (c) N (d) Ns.	
5	For recorded players a ..... motor is suitable. (a) Repulsion (b)Hysteresis (c)Stepper (d) Shaded pole	
6	A two pole alternator running at 1500 rpm will generate emf at ..... Hz. (a) 60 (b)25 (c) 55 (d) 50	
7	The effect of increasing the length of air-gap in an induction motor will be to increase the (a) power factor (b) speed (c) magnetising current (d) air-gap flux.	
8	The rotor of an alternator has ..... slip rings for DC supply. (a) 0 -zero (b) 3 (c) 4 (d) 2	
9	When applied rated voltage per phase is reduced by one-half, the starting torque of a SCIM becomes ..... of the starting torque with full voltage. (a) 1/2 (b) 1/4 (c) 1/ 2 (d) 3/2	
10	The power factor of an alternator depends on (A) Load (B) Speed of rotor (C) Core losses (D) Armature losses.	
11	V curves for a synchronous motor represent relation between (A) field current and speed (B) field current and power factor (C) power factor and speed (D) armature current and field current.	
12	Which synchronous motor will be smallest in size ? (A) 5 HP, 500 rpm (B) 5 HP, 375 rpm (C) 10 HP, 500 rpm (D) 10 HP, 375 rpm.	

13 The breakdown. torque of a synchronous motor varies as

(A)1 /(applied voltage) (B) 1/(applied voltage)^2

(C) applied voltage (D) (applied voltage)^2.

14 The efficiency and p.f. of a SCIM increases in proportion to its
(a) speed (b) mechanical load (c) voltage (d) rotor torque

Q.2	**(a)**	Explain the working principle of Induction Generator.	**03**
	(b)	What is harmonic torques?	**04**
	(c)	Explain working principle and construction of induction motor. Also differentiate squirrel cage and slip ring induction motor.	**07**
		OR	
	(c)	Derive the equation of electromagnetic torque for a three phase induction motor with usual notations from first principles.	**07**
Q.3	**(a)**	Define voltage regulation of an Alternator	**03**
	(b)	Briefly describe the construction and working of linear induction motor.	**04**
	(c)	What is voltage regulation of an alternator? Explain any one method to find out voltage regulation of an alternator.	**07**
		OR	
Q.3	**(a)**	Define pitch factor and distribution factor of an alternator.	**03**
	(b)	What is the role of commutator In AC commutator motor?	**04**
	(c)	Describe the effect of armature reaction in case of a synchronous generator.	**07**
Q.4	**(a)**	Derive the emf equation of an alternator.	**03**
	(b)	Differentiate between cylindrical synchronous machine and salient pole synchronous machine.	**04**
	(c)	Explain the procedure to construct the circle diagram of induction motor. Also describe the method to determine losses, efficiency and slip at full load condition using circle diagram.	**07**
		OR	
Q.4	**(a)**	What is synchronization?	**03**
	(b)	Write a short note on auto synchronous motor.	**04**
	(c)	Explain with reason why synchronous motor is not self-starting. Discuss the methods of starting the synchronous motor.	**07**
Q.5	**(a)**	Why rotor of cylindrical rotor synchronous machines is not laminated?	**03**
	(b)	Explain DOL starter in detail.	**04**
	(c)	Mention the types of single phase AC motors. Explain the construction and working of shaded pole single phase motor.	**07**
		OR	
Q.5	**(a)**	What is Hunting in synchronous machine?	**03**
	(b)	Derive the maximum starting torque condition for three phase induction motor	**04**
	(c)	Why single phase induction motors are not self-started? Explain double field revolving theory for single phase induction motor.	**07**