Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

BE – SEMESTER- V EXAMINATION-SUMMER 2023

Subject Code: 3150910 Date: 26/06/2023

Subject Name: Electrical Machine- II

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.**
4. **Simple and non-programmable scientific calculators are allowed.**

			MARKS
Q.1	**(a)**	Explain with reason why synchronous motor is not self starting?	**03**
	(b)	Draw slip Torque characteristic of 3 phase Induction motor and explain in brief.	**04**
	(c)	Define and describe the effect of armature reaction in an alternator.	**07**
Q.2	**(a)**	Compare squirrel cage and slip ring Induction Motors.	**03**
	(b)	Explain double field revolving theory for single phase Induction Motor.	**04**
	(c)	A 415 V, 3 phase, 50 HZ,4 pole star connected Induction motor takes a line current of 11 A with 0.85 p.f. lagging. Its total stator losses are 6% of the input. Rotor copper losses are 4% of the input to the rotor; mechanical losses are 3 % of the rotor input. Calculate (i) slip and rotor speed (ii) torque developed in the rotor and (iii) shaft torque.	**07**
		OR	
	(c)	A 750 Hp, 415 V, 3 Phase 50 Hz 12 pole induction motor has a rotor impedance of (0.02+j0.15) ohms at standstill. Full load torque is obtained at 480 RPM. Calculate (i) ratio of maximum to full load torque (ii) speed at maximum torque (iii) rotor resistance required to be added to get maximum starting torque.	**07**
Q.3	**(a)**	Differentiate between salient pole and cylindrical rotor synchronous machine.	**03**
	(b)	Explain construction and working of shaded pole single phase motor.	**04**
	(c)	Discuss the procedure to perform no load and blocked rotor tests on a three phase induction motor.	**07**
		OR	
Q.3	**(a)**	Define pitch factor and distribution factor.	**03**
	(b)	Explain star delta starter for 3 phase Induction Motor.	**04**
	(c)	Define voltage regulation and explain zero power factor method in case of an alternator.	**07**
Q.4	**(a)**	State the conditions to be satisfied for putting a 3 phase alternator in parallel with infinite bus.	**03**
	(b)	Briefly explain V-curves of synchronous motor.	**04**

	(c)	The effective resistance and synchronous reactance of a 100 KVA,440 V single phase alternator are 0.1 ohms and 0.3 ohms resp. Calculate the full load regulation at (i) unity (b) 0.8 lagging and (iii) 0.8 leading power factors.	**07**

OR

Q.4	**(a)**	How direct axis and quadrature axis reactance can be measured for salient pole machine?	**03**
	(b)	Explain direct load test method for 3 phase alternator with circuit diagram.	**04**
	(c)	The effective armature resistance of a 3 phase star connected, 500 KVA, 1100 V alternator is 0.1 ohms per phase. Field current of 30 A produces the open circuit voltage of 400 V (line value) and the short circuit current of 200 A. Calculate the full load regulation at 0.8 p,f. lagging.	**07**
Q.5	**(a)**	What do you mean by Auto Synchronous motor?	**03**
	(b)	What is hunting? How to minimize it?	**04**
	(c)	What is linear Induction motor? Describe its construction, working and application.	**07**

OR

Q.5	**(a)**	Explain synchronous condenser and synchronous phase modifiers.	**03**
	(b)	Explain the procedure to construct the Circle diagram of Induction motor.	**04**
	(c)	Explain construction, working and applications of Permanent magnet brushless DC motor.	**07**

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