

Seat No.: _____

Enrolment No. _____

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER-IV (NEW) - EXAMINATION – SUMMER 2018

Subject Code:2140906

Date:22/05/2018

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	(a) Define and explain pitch factor and distribution factor with respect to an alternator.	03
	(b) Compare squirrel cage and slip ring Induction Motor.	04
	(c) Explain the torque slip characteristics of a three phase induction motor and describe the significance of stable and unstable region.	07
Q.2	(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) Explain the methods used for finding the slip of a three phase induction motor.	07
	OR	
	(c) Mention different starters for three phase Induction Motor and explain Auto-Transformer starter in detail.	07
Q.3	(a) A three phase 400/200V, Y-Y connected wound rotor has 0.06 Ω rotor resistance and 0.3 Ω standstill reactance per phase. Find the additional resistance required in the rotor circuit to make the starting torque equal to the maximum torque of the rotor.	03
	(b) Explain the procedure to construct the Circle diagram of Induction motor.	04
	(c) Define and describe the effect of Armature reaction in an alternator.	07
	OR	
Q.3	(a) Briefly explain the double field revolving theory in relation to single phase AC motors.	03
	(b) A 100 KVA, 3000V, 50Hz, 3phase star-connected alternator has effective armature resistance of 0.2 Ω . The field current of 40 A produces short circuit current of 200A and an open circuit voltage of 1040V (line value). Calculate the full load voltage regulation at 0.8 p.f. lagging and 0.8 p.f. leading.	04
	(c) List the different methods for speed control of an Induction motor and explain any two in detail with necessary diagram.	07
Q.4	(a) Derive Emf equation of an alternator.	03
	(b) Explain the construction and working of universal motor.	04
	(c) A synchronous motor improves the power factor of a factory load of 100KW from 0.7 lagging to 0.95 lagging. Simultaneously the motor is driving mechanical load of 50KW. Find the leading KVA _r supplied by the motor and the motor Power factor.	07

OR

- Q.4** (a) What is hunting? How to minimize it? **03**
(b) Define voltage regulation and explain any one method in case of an alternator. **04**
(c) Explain construction and working principle of Schrage Motor. **07**
- Q.5** (a) Explain working principle of Induction Generator. **03**
(b) Explain cogging and crawling in 3 phase Induction Motor with their remedies. **04**
(c) Explain V-curves and its importance for synchronous motor. **07**

OR

- Q.5** (a) Explain slip test for measurement of direct and quadrature axis reactances for salient pole machine. **03**
(b) What is the role of commutator in AC commutator motor? **04**
(c) What is synchronization? Explain two bright and one dark lamp method of synchronization of 3 phase alternators. **07**
