Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER–III (NEW) EXAMINATION – WINTER 2021

Subject Code:3132407 Date:23-02-2022

Subject Name:Electrical Machines and Applications

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

			Marks
Q.1	**(a)**	Define the following terms: 1.Pole pitch 2. Coil Pitch. 3. Commutator Pitch	**03**
	(b)	List the parts of DC Generator. Explain at least four in brief with necessary diagram and application.	**04**
	(c)	Define Generator. Explain the Classification of DC Generator with suitable diagram. Derive EMF equation of DC Generator.	**07**
Q.2	**(a)**	Define Pitch Factor and Distribution Factor. Enlist advantage and disadvantages of Short pitch or Fractional pitch Coil.	**03**
	(b)	List at differences between Lap and Wave Winding in DC Machine.	**04**
	(c)	Draw and Explain Power Flow Diagram for DC Generator and DC Motor.	**07**
		OR	
	(c)	Define Transformer. Explain the Classification of Transformer with Suitable diagram. Derive EMF Equation of Transformer.	**07**
Q.3	**(a)**	What is SC Test? Explain the procedure to carry out SC Test.	**03**
	(b)	Discuss essential and desirable conditions to be satisfied for parallel operation of two 1-Ø transformers.	**04**
	(c)	Explain necessity of starters. Explain 3-point starter for DC shunt motor with neat diagram.	**07**
		OR	
Q.3	**(a)**	What is OC Test? Explain the Procedure to Carry out OC Test.	**03**
	(b)	Draw a no load Phasor diagram of a 1-Ø transformer and explain.	**04**
	(c)	Classify DC motors with chart. Also explain characteristics of DC shunt motor.	**07**
Q.4	**(a)**	Explain only constructional difference between squirrel case and wound rotor 3 Ø Induction Motor	**03**
	(b)	Draw Slip Torque characteristic of 3 phase Induction motor and explain in brief.	**04**
	(c)	State and Explain Production of Rotating Magnetic Field for 3- Ø Induction motor.	**07**

OR

Q.4	**(a)**	What is Linear Induction motor? Explain in brief with its application.	**03**
	(b)	Derive the torque equation of 3 Ø Induction Motor.	**04**
	(c)	List the types of Single Phase induction motor. Explain the operational principal of any one split phase induction motor with necessary sketch and vector diagram.	**07**
Q.5	**(a)**	Derive the EMF equation of an alternator.	**03**
	(b)	Explain the construction and working of Repulsion motor.	**04**
	(c)	Mention the methods of determination of voltage regulation of an alternator. Describe the Synchronous impedance (EMF) method in detail.	**07**

OR

Q.5	**(a)**	Why synchronous motor is not self starting? Describe in brief.	**03**
	(b)	Explain the construction and working of Stepper motor.	**04**
	(c)	What is synchronization? Explain two bright one dark lamp method and all dark lamp method of synchronization in brief.	**07**

****