Seat No.: _____ Enrolment No.

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER– V(OLD) EXAMINATION – SUMMER 2019

Subject Code:150904 **Date:20/06/2019**

Subject Name:Elements Of Electrical Design

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.**

Q.1	**(a)**	Design and develop a mush winding for a stator of 3-phase A.C machine having 4 pole and 36 slots.	**07**
	(b)	With neat sketch explain power and control circuit diagram of a star delta starter.	**07**
Q.2	**(a)**	Explain the design procedure to design a field regulator to change the Emf generated in a self excited dc generator.	**07**
	(b)	An electromagnet coil has an outer diameter of 0.6 m and an internal diameter of 0.3 m. its height is 0.25 m. the outer cylindrical surface of the coil can dissipate 1200 watt/ m^2. Calculate the total mmf of the coil if voltage applied across the coil is 100 Volt. Assume space factor = 0.6, Resistivity = 0.02 ohm/m/mm^2 .	**07**
		OR	
	(b)	Discuss step by step complete procedure to design a horse shoe type electromagnet for a given supply voltage, required force and stroke.	**07**
Q.3	**(a)**	Define real and apparent flux densities in the tooth of a d.c. machine armature. Explain difference between them and also derive relation between them.	**07**
	(b)	Design a suitable 8 section starter for a 14.92 kW, 250 volt, 1000 rpm d.c. shunt motor. Given: Max torque = Full load torque. Armature resistance = 0.4 ohm. Efficiency = 85%. Also determine the speeds at which notching takes place.	**07**
		OR	
Q.3	**(a)**	What is Carter's fringing curves? Discuss its application.	**07**
	(b)	Discuss design procedure of single phase small transformer.	**07**
Q.4	**(a)**	Discuss the design procedure of 3-phase variable choke coil.	**07**
	(b)	Find the front pitch, back pitch, winding pitch and commutator pitch for a simplex wave wound 13 slots, 4-pole d.c armature with 13 commutator segments. Draw winding diagram in developed form. Assume no. of coil Side/slot = 2.	**07**
		OR	
Q.4	**(a)**	Name various types of lifting electromagnets commonly used in practice and give comparison between them	**07**
	(b)	Explain the design procedure of a Welding transformer.	**07**
Q.5	**(a)**	Explain how the ratio of height of coil to depth of coil affects electromagnet design.	**07**
	(b)	Explain load assessment and permissible voltage drop for electric installations.	**07**

OR

Q.5 **(a)** What is electric load? Giving examples classify different types of load. **07**

(b) The domestic load in residential building comprises of the following :
6 lamps of 55 watt each, 4 fans of 80 watt each, 1 refrigerator of 300 watt, 1 heater of 1000 watt, Television of 120 watt. Calculate
(1) The total current taken from the supply at a voltage of 230 volts.
(2) The energy consumed in a day, if on average only a quarter of the above load persists all the time.

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