Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

PDDC - SEMESTER–V • EXAMINATION – WINTER • 2014

Subject Code: X 50902 **Date: 02-12-2014**

Subject Name: Elements of Electrical Design

Time: 10:30 am - 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.**

Q.1	**(a)**	What are eddy current losses? Explain how they are estimated per unit weight of the machine.	**07**
	(b)	Prepare winding layout for a three phase a.c. machine having 24 armature slots, 4 pole mush winding.	**07**
Q.2	**(a)**	Draw and explain power and control circuit of a star delta starter.	**07**
	(b)	Prove that section resistances are in geometrical progression for a d.c.shunt motor starter.	**07**
		OR	
	(b)	Design 5 sections of a six stud rotor resistance starter for a three phase wound rotor induction motor. The slip at full load current is 2% and the maximum starting current is to be full load current. The resistance of rotor per phase is 0.02Ω.	**07**
Q.3	**(a)**	Discuss advantages of short pitch winding. Explain how the slot distribution is done for fractional slot winding.	**07**
	(b)	An electromagnetic coil has an outer diameter of 0.6 m and internal diameter of 0.3 m. Its height is 0.32 m. The outer cylindrical surface of the coil can dissipate 1150 W/m^2. Determine total mmf of the coil if voltage applied across the coil is 100 V. Assume space factor = 0.6 and resistivity of 0.02 Ω/m/mm^2.	**07**
		OR	
Q.3	**(a)**	Explain following terms clearly: (1) Stacking factor. (2) Gap contraction factor (3) Space factor.	**07**
	(b)	Explain the design procedure of flat faced armature type small circular magnet.	**07**
Q.4	**(a)**	Explain the design procedure of a three phase variable choke coil.	**07**
	(b)	Explain the concept of real and apparent flux densities	**07**
		OR	
Q.4	**(a)**	Explain design procedure of a welding transformer.	**07**
	(b)	Write note on Dummy coils and equalizer connections.	**07**
Q.5	**(a)**	Discuss classification of electric loads.	**07**
	(b)	Define following terms with respect to illumination scemes. (1) Lumen (2) Solid angle. (3) Luminous efficiency (4) Waste light factor (5) Co efficient of utilization.	**07**

OR

Q.5	**(a)**	Compare different types of domestic wiring system.	**07**
	(b)	A generating station has a connected load of 60 MW and a maximum demand of 30 MW, the units generated per annum are 90 x 10^6. Determine the load factor and the demand factor.	**07**

****