Enrolment No.____

Date: 06/05/2016

Total Marks: 70

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GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER-V- EXAMINATION – SUMMER 2016 Subject Code: 150904 Dat

Subject Name: Elements of Electrical Design

Time: 02:30 PM to 05:00 PM

Instructions:

- 1. Attempt all questions.
- 2. Make suitable assumptions wherever necessary.
- 3. Figures to the right indicate full marks.
- Q.1 (a) Derive the steps to calculate the starter resistance for D.C. Shunt motor
 (b) Calculate the front ,back, winding and Commutator pitch for the 15 slots,
 4-pole, 2-conductors per slot, also make the winding table for the windings.
- Q.2 (a) Explain the calculation of MMF for air gap.
 - (b) Determine the air gap length of a d.c. machine from the following data. Gross core length = 0.10 m, width of duct= 10 mm, slot pitch = 24 mm, Slot width = 12 mm, Carter's coefficient for slots and ducts = 0.3, gap flux density at pole center = 0.65 T, field MMF for pole = 3700 A, MMF required for iron parts of magnetic circuits = 650 A.

OR

	(b)	Explain the following terms (i) Field form factor (ii) Carter's Gap co-efficient (iii)Stacking factor	07
Q.3	(a) (b)	Explain the automatic star-delta starter with suitable circuit diagram. Calculate the steps in a 4-sections rotor resistance starter for a 3-phase slip ring induction motor from the following data. Full load slip = 3% Maximum starting current = full load current Rotor resistance per phase = 0.03Ω	07 07
0.1		OR Line to the lin	05
Q.3	(a)	Explain the use of dummy coils and equalizer connections in d.c.machine winding.	07
	(b)	Differentiate between lap and wave winding and also give application of it.	07
Q.4	(a)	Name various types of lifting electromagnet commonly used in practice and give comparison between them.	07
	(b)	State the four fundamentals equation used for the design of plunger type electromagnet.	07
OR			
Q.4	(a) (b)	Explain the steps for designing small transformer. What is electric power supply system? With the help of a single line diagram explain typical ac power supply system	07 07
Q.5	(a) (b)	Discuss the design procedure of 1-phase variable choke coil. Describe and compare different types of wiring system used in residential. OR	07 07
Q.5	(a)	The domestic load in residential building comprises of the following. 5 lamps of 60 watt each, 1 refrigerator of 350 watt, 4 fans of 80 watt each and one heater of 1000 watt. Calculate (1) the load current taken from the supply	07

at voltage of 230 volts.

(2) The energy consumed in a day, if average only a half of the above load persists all the time.(b) Explain the factors while designing a good wiring system.

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