Seat No.: Enrolment No		Enrolment No	
	Subie	GUJARAT TECHNOLOGICAL UNIVERSITY BE - SEMESTER-V (OLD) - EXAMINATION – SUMMER 2017 et Code: 150904 Date: 27/04/2017	7
	•	et Name: Elements of Electrical Design	'
	•	02:30 PM to 05:00 PM Total Marks: 70	n.
	I iiiie: Instruct		J
	1. 2.	Attempt all questions. Make suitable assumptions wherever necessary. Figures to the right indicate full marks.	
Q.1	(a)	A three phase 4 pole induction motor has 24 slots in its armature. It is required to prepare double layer wave winding. Explain winding layout with clear explanation of all abnormal steps used.	08
	(b)	Explain the significance of dummy coil and equalizer connection.	06
Q.2	(a)	Design the sections of a rotor starter for a 75 kW, 3 phase induction motor using 6 sections. Rotor resistance per phase =0.018 ohm. The upper current limit is to be full load current for which the slip is 2%.	07
	(b)	Derive equation for resistance sections for a d.c. shunt motor starter. OR	07
	(b)	With the help of power and control circuit diagram explain working of Autotransformer starter for three phase induction motor.	07
Q.3	(a)	Clearly explain following terms. Draw sketches wherever necessary. (1) Stacking factor (2) Gap contraction factor (3) Field form factor (4) Window space factor.	07
	(c)	Determine required mmf for the air gap of a machine which has following data: Core length =0.32m including 4 ducts of 1 cm each; Pole arc = 0.19m; Slot pitch = 6.54 cm; Slot opening = 5 mm; Length of air gap = 5 mm; Flux per pole = 0.052 wbr; Assume Carter's co efficient =0.18 for opening/gap =1 and 0.28 for opening/gap=2.	07
0.3	(-)	OR	07
Q.3	(a)	Discuss factors on which hysteresis losses and eddy current losses depend. Also explain how these losses can be estimated from design data.	07
	(b)	Explain the concept of real and apparent flux density in detail.	07
Q.4	(a) (b)	Explain how height of coil to depth of coil ratio affects the electromagnet design. Explain the design procedure of a small single phase transformer.	07 07

OR

A 250 V, 1.5 kW single element resistor is made from 0.2 mm thick nickel chrome

strip. The temperature rise of strip is not to exceed 300°C over the ambient

Which are different types of wiring systems? Explain any two in detail.

Explain load assessment and permissible voltage drop for electric installations.

Discuss design procedure for the coil of an electromagnet.

Q.4

Q.5

(a)

(b)

(a)

temperature of 30°C.

07

07

07

07

Calculate the length and width of the strip.

Assume emissivity=0.9, Radiating efficiency =1, Resistivity= 1x $10^{-6} \Omega$ -m.

OR

Q.5 (a) Explain the process of electrification of a small industry.

07

- (b) A generating station has a connected load of 100 MW and maximum demand of 55 **07** MW. The number of units generated per annum is 14 x10⁷. Determine
 - (1) The demand factor (2) The load factor.
