Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER–VI (NEW) EXAMINATION – SUMMER 2023

Subject Code:3160918 Date:12-07-2023

Subject Name:Element of Electrical Design

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)**	Explain working of No Volt Coil and Overload Release coil in terms of three point starters for DC motor	**03**
	(b)	Why is starter required in case in DC motors? Explain construction of three point starter in details.	**04**
	(c)	Describe design procedure for core and windings of a small single-phase transformer.	**07**
Q.2	**(a)**	Discuss the factors to be consider for exact calculation of MMF for Teeth.	**03**
	(b)	Write a Short Note on: Real and apparent flux density.	**04**
	(c)	Calculate the air gap length of a dc machine from the following particulars: gross length of core = 0.12 m; number of ducts = one and is 10 mm wide ; slot pitch = 25 mm ; slot width = 10 mm carter's coefficient for the slots and ducts = 0.32 ; gap density at pole center = 0.7 wb/m^2 , field mmf per pole = 3900 A, mmf required for iron parts of magnetic circuit = 800 A.	**07**
		OR	
	(c)	Classify the different insulating materials on the basis of operating temperature	**07**
Q.3	**(a)**	Define: 1) Front Pitch 2) Back Pitch 3)Commutator Pitch	**03**
	(b)	Give the comparison between Lap winding and Wave winding.	**04**
	(c)	Write a detailed note on various types of AC armature winding and explain any one with example	**07**
		OR	
Q.3	**(a)**	What is difference between Full pitch winding and chorded winding.	**03**
	(b)	Explain the use of dummy coils and equalizer connections in d.c. armature windings. Also explain why equalizer connections are not necessary in case of wave windings?	**04**
	(c)	Find and give comments whether the following lap windings are symmetrical or not: (i) 4-pole, 22-slots, 22 coils (ii) 6-pole, 19-slots, 19 coils	**07**
Q.4	**(a)**	Define: 1) Connected load 2) Demand factor 3) Load factor	**03**
	(b)	Explain the selection of permissible voltage drop and conductor size during design of an electric wiring.	**04**

	(c)	A Domestic building has (i) 10 light points of 40 W each, burning 4 hours a day;(ii) 04 fan points of 70 W each, running 2 hours a day;(iii) a plug point for a 1500 W heater, used 1 hours a day;(iv) One television of 120 W, used 6 hours a day; and (v) 0.5 hp pump, running 1 hours a day. Calculate (a) total connected load in KW (b) maximum possible current (c) daily consumption of energy (d) monthly bill if one unit cost is Rs. 5.00	**07**
		OR	
Q.4	**(a)**	Which materials are required for installation of service connection?	**03**
	(b)	What is electric load? Give examples and classify different types of loads.	**04**
	(c)	Explain types of wiring.	**07**
Q.5	**(a)**	Discuss in brief points to be considered while determination of the size of conductor.	**03**
	(b)	Draw a wring diagram and schematic for light and fan circuit.	**04**
	(c)	Explain the installation plan, wiring diagram and single line diagram for electric wiring based on a given load. Also give the rules for deciding the number of sub circuits and power circuit.	**07**
		OR	
Q.5	**(a)**	How can you determine the number of sub circuits, rating of main switch and distribution board?	**03**
	(b)	List out the essential elements of estimating and costing before starting any electrical project.	**04**
	(c)	Explain the factors to be considered while selecting the type of wiring.	**07**