GUJARAT TECHNOLOGICAL UNIVERSITY
BE- SEMESTER–VI (NEW) EXAMINATION – WINTER 2024

Subject Code:3160918   **Date:02-12-2024**

Subject Name:Element 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.**
4. **Simple and non-programmable scientific calculators are allowed.**

			MARKS
Q.1	**(a)**	List the properties of good insulating materials?	**03**
	(b)	Differentiate single layer and double layer winding.	**04**
	(c)	Explain step by step design procedure of a small single-phase transformer.	**07**
Q.2	**(a)**	Define: (1) back pitch (2) pole pitch (3) winding pitch	**03**
	(b)	Discuss function & necessity of field regulator in case of DC shunt motor.	**04**
	(c)	Design and develop a mush winding for a 6-pole, 36 slots, 3-phase stator of ac machine.	**07**
		OR	
	(c)	Find the Front pitch, back pitch, winding pitch and commutator pitch for a simplex wave wound 15 slots, 4-pole d.c armature with 15 commutator segments. Draw the winding diagram in developed form. Also draw the sequence diagram to indicate the position of brushes. Assume number of coil sides per slot = 2	**07**
Q.3	**(a)**	Discuss function & necessity of field regulator in case of DC series motor.	**03**
	(b)	Explain the use of dummy coils and equalizer connections in d.c. armature windings.	**04**
	(c)	Design a suitable 8 section starter for a 3.7 KW, 250 V, 1000 rpm D.C. shunt motor from the following data: Maximum starting torque = 1.5 times Full load torque, Armature circuit resistance = 1Ω, Full load efficiency = 0.82, Field current=1.2A	**07**
		OR	
Q.3	**(a)**	Discuss B-H curve in magnetic circuit	**03**
	(b)	Write comparison between simplex lap and simplex wave winding applied to dc armature.	**04**
	(c)	Design a suitable 4 section rotor resistance starter for a 3-phase induction motor having full load slip 2.5%. Maximum starting current=full load current and rotor resistance/phase=0.025Ω	**07**
Q.4	**(a)**	List the factors that should be considered while selecting the type of wiring system?	**03**
	(b)	State and explain methods for calculating MMF required for tooth in DC machine.	**04**
	(c)	Explain steps for design of single-phase variable chock coil.	**07**
		OR	
Q.4	**(a)**	State the rules for electrical wiring as per IS.	**03**
	(b)	What is Carter's fringing curve? Why it is used.	**04**
	(c)	Discuss the different types of loads with examples.	**07**
Q.5	**(a)**	List the benefits and advantages of soft starter?	**03**

(b)	State and explain the various components/devices used in the control panel.	**04**
(c)	Explain with neat sketches, the different systems of wiring used for domestic installations.	**07**

OR

Q.5	**(a)**	Define: (1) maximum demand (2) load factor (3) diversity factor	**03**
	(b)	Explain the importance of (a) current carrying capacity and (b) voltage drop while determining the size of conductor.	**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**

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