Enrolment No./Seat No_____

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER–IV (NEW) EXAMINATION – SUMMER 2024

Subject Code:3140913 Date:20-07-2024

Subject Name: Electrical Machine- I

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)**	Define the terms: (a) magnetic flux (b) mmf (c) reluctance	**03**
	(b)	Compare electrical and magnetic circuit.	**04**
	(c)	Derive EMF equation of transformer.	**07**
Q.2	**(a)**	State the condition for parallel operation of three phase transformer.	**03**
	(b)	Explain working principle of transformer.	**04**
	(c)	With diagram explain construction of DC machine.	**07**
		OR	
	(c)	With diagram explain construction of single phase transformer.	**07**
Q.3	**(a)**	Define Biot Savart Law.	**03**
	(b)	Draw connection diagrams and winding diagrams for Dd0, Yd1, and Dy11.	**04**
	(c)	Explain OC and SC test of single phase transformer.	**07**
		OR	
Q.3	**(a)**	Explain Energy Stored in a Magnetic Field.	**03**
	(b)	Explain the methods of speed control on DC shunt motor.	**04**
	(c)	Explain with diagram different cooling methods used for transformer.	**07**
Q.4	**(a)**	List the applications of DC motor.	**03**
	(b)	What is armature reaction of DC generator? Explain in brief.	**04**
	(c)	Explain 3-point starter for DC motor.	**07**
		OR	
Q.4	**(a)**	What is the necessity of starter in DC motor?	**03**
	(b)	Explain Scott-connection of transformer in detail.	**04**
	(c)	Give classification of DC generators with neat connection diagram.	**07**
Q.5	**(a)**	Explain different types of losses in transformer.	**03**
	(b)	Derive condition for maximum efficiency for single phase transformer.	**04**
	(c)	Give a comparison of an auto transformer with a two-winding transformer.	**07**
		OR	
Q.5	**(a)**	Define “All day efficiency” and “ Voltage regulation” of transformer.	**03**
	(b)	Derive the EMF equation of a DC generator.	**04**
	(c)	What is Tap Changer? Explain on load tap changer and off load tap changer of transformer.	**07**

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