Enrolment No./Seat No_____

GUJARAT TECHNOLOGICAL UNIVERSITY

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

Subject Code:3140913 Date:22-11-2024

Subject Name:Electrical Machine- I

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)**	State and explain working principle of transformer.	**03**
	(b)	Compare between electrical and magnetic circuit.	**04**
	(c)	With diagram explain construction of DC Machine.	**07**
Q.2	**(a)**	Define Biot Savart Law.	**03**
	(b)	Explain the terms: (1) MMF (2) Reluctance (3) Inductance (4) Flux	**04**
	(c)	What is the necessity of starter in a DC motor? Explain the working of 3-point starter.	**07**
		OR	
	(c)	Explain the methods of speed control on DC shunt motor.	**07**
Q.3	**(a)**	State and explain Ampere's law.	**03**
	(b)	State the condition for parallel operation of three phase transformer.	**04**
	(c)	With diagram explain construction of single phase transformer.	**07**
		OR	
Q.3	**(a)**	Explain different types of losses in transformer.	**03**
	(b)	Explain Scott-connection of transformer in detail	**04**
	(c)	Explain OC and SC test of single phase transformer.	**07**
Q.4	**(a)**	State and explain the working principle of DC Generator.	**03**
	(b)	Derive the EMF equation of a DC generator.	**04**
	(c)	Derive condition for maximum efficiency for single phase transformer.	**07**
		OR	
Q.4	**(a)**	Explain Energy Stored in a magnetic field.	**03**
	(b)	Draw connection diagrams and winding diagrams for Dd0, Yd1, and Dy11.	**04**
	(c)	What is Tap Changer? Explain on load tap changer and off load tap changer of transformer.	**07**
Q.5	**(a)**	List the applications of DC motors.	**03**
	(b)	Give a comparison of an auto transformer with a two winding transformer.	**04**
	(c)	Explain with diagram different cooling methods used for transformer.	**07**
		OR	

Q.5	**(a)**	Define All day efficiency and Voltage regulation for a single phase transformer.	**03**
	(b)	Derive EMF equation of transformer.	**04**
	(c)	Give classification of DC generators with neat connection diagram.	**07**

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