

GUJARAT TECHNOLOGICAL UNIVERSITY**BE- SEMESTER-V EXAMINATION – WINTER 2025****Subject Code:3152001****Date:02-12-2025****Subject Name:Electro Mechanical Energy Conversion****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 and explain Magnetic flux and flux density.	03
	(b) Enlist Properties of magnetic materials.	04
	(c) Explain the energy conversation procedure of Doubly excited magnetic systems.	07
Q.2	(a) Define the terms Self-inductance and Mutual inductance.	03
	(b) What is the difference between Generated and induced emf?	04
	(c) Explain Methods of analysis of ferromagnetic circuits.	07
	OR	
	(c) Explain (1) Ampere's law (2) Faraday's law (3) Lenz's law	07
Q.3	(a) Draw and explain Equivalent circuits of iron core reactors.	03
	(b) Explain Field energy and Mechanical force in singly excited systems	04
	(c) Explain in brief the classification of DC machines. Enlist the operating principle of each DC machine.	07
	OR	
Q.3	(a) Write the operating principles of the Synchronous generator and Synchronous motor.	03
	(b) Explain power flow diagrams of DC machines.	04
	(c) Explain the construction and working principle, various losses, and efficiency performance of the 3-phase induction motor.	07
Q.4	(a) Discuss advantages of rotating field alternator.	03
	(b) Explain torque slip characteristics of 3-phase induction motors.	04
	(c) Explain Methods of starting of synchronous motor.	07
	OR	
Q.4	(a) Why single phase induction motor not self-starting? List out the starting methods of single phase induction motor.	03
	(b) What is fringing and leakage flux? Explain in brief.	04
	(c) Explain Various types of single phase Induction motors and their characteristics.	07
Q.5	(a) Enlist applications of Repulsion motor and universal motor.	03
	(b) Explain functions of Saturated reactors.	04
	(c) Explain Types, construction, operating principle, characteristics and applications of PMDC and BLDC motor.	07
	OR	
Q.5	(a) Enlist applications of Reluctance motor and Hysteresis motor.	03
	(b) Explain any one Method of starting of single phase induction motor.	04
	(c) Explain Types, construction, operating principle, characteristics and applications of AC and DC servo motor.	07
