

Enrollment No./Seat No.:

GUJARAT TECHNOLOGICAL UNIVERSITY
Bachelor of Engineering - SEMESTER - VII EXAMINATION - WINTER 2025

Subject Code: 2170908

Date: 26-11-2025

Subject Name: Switch Gear and Protection

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) Discuss the factors to be considered while selecting a CT for protection and metering purpose.	03
(b) Explain the concept of protective zones with a neat diagram.	04
(c) Discuss the importance of backup protection in case of primary relay failure.	07
Q.2 (a) Explain the construction and working principle of Air-break circuit breaker.	03
(b) Explain IDMT relay and its advantages.	04
(c) Explain how overcurrent relays detect and isolate faults on transmission lines.	07
OR	
(c) Describe the construction, types, and working of electromagnetic overcurrent relays with neat diagrams.	07
Q.3 (a) Give difference between measurement & protective CT.	03
(b) What causes inter-turn short circuits in transformers?	04
(c) Explain the Percentage Differential Protection. State the various application.	07
OR	
(a) How can differential and overcurrent relays detect inter-turn faults?	03
(b) Explain the construction and operation of SF ₆ (Sulphur hexafluoride) circuit breakers.	04
(c) Describe the methods of detecting and protecting against high-resistance ground faults.	07
Q.4 (a) Explain the Reasons for inaccuracy of Distance Relay Reach.	03
(b) Write short note on Directional Impedance Relay.	04
(c) Write a short note on Mho Relay.	07
OR	
(a) Explain Need for carrier aided protection of transmission lines.	03

- (b) Explain the principle of operation of a unit type carrier aided directional comparison relay. 04
- (c) Describe the concept of three step distance protection with zone setting. 07
- Q.5** (a) Explain the different faults and abnormal conditions that can occur in a generator 03
- (b) Describe the role of ionized gases and plasma in maintaining the arc. 04
- (c) Explain the key functional block diagram of a numerical relay 07

OR

- (a) State the advantages of numerical relays over conventional electromechanical and static relays. 03
- (b) Explain the role of circuit constants in determining breaker performance 04
- (c) Discuss in detail the various faults and abnormal operating conditions of induction motors, including causes and consequences 07
