Enrolment No./Seat No_____

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER–VII EXAMINATION – SUMMER 2025

Subject Code:3170908 Date:19-05-2025

Subject Name:Switchgear And Protection

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)**	Explain the terms Sensitivity and selectivity with respect to their use in the protective relaying field.	**03**
	(b)	Explain Plug setting and time setting of Over current relay.	**04**
	(c)	Discuss the working principle of an induction disc relay. Also derive an expression for the torque produced by it.	**07**
Q.2	**(a)**	What are the drawbacks of a simple differential scheme?	**03**
	(b)	Explain reverse power relay.	**04**
	(c)	What do you mean by Earth Leakage Protection? Explain Earth leakage protection for single phase load.	**07**
		OR	
	(c)	Why are over current relays not used for primary protection of EHV lines?	**07**
Q.3	**(a)**	Explain principle of simple Impedance relay. Also draw characteristic.	**03**
	(b)	Explain the need of a three steps distance protection of a transmission line.	**04**
	(c)	With schematic, explain protection from phase fault and ground fault inside the three phase induction motor.	**07**
		OR	
Q.3	**(a)**	Explain the inrush phenomenon in transformers.	**03**
	(b)	What are incipient faults? Discuss in detail the type of protection provided in transformer to cater to such type of faults	**04**
	(c)	Explain rotor earth fault protection for the generator with a diagram.	**07**
Q.4	**(a)**	What are the effect of single phasing on the Induction Motor?	**03**
	(b)	In relation to circuit breaker arc interruption, explain the recovery rate theory and energy balance theory.	**04**
	(c)	Explain the basic schematic of differential protection of bus-bars. Explain its behavior with reference to internal and external faults.	**07**
		OR	
Q.4	**(a)**	Explain the concept of adaptive relaying.	**03**
	(b)	Explain Making capacity & Breaking Capacity of Circuit Breakers.	**04**
	(c)	What is meant by loss of excitation in a generator? What protection is used against it?	**07**
Q.5	**(a)**	Why is SF6 a nearly ideal medium for arc interruption?	**03**

	(b)	Discuss the difference between the measuring CT and protecting CT.	**04**
	(c)	Draw and explain the general block diagram of numerical relay	**07**
		OR	
Q.5	**(a)**	Compare Reactance relay & MHO relay.	**03**
	(b)	Explain the principle of percentage biased differential protection with harmonic restraint.	**04**
	(c)	Explain construction and working of Minimum Oil Circuit Breaker (MOCB).	**07**

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