

GUJARAT TECHNOLOGICAL UNIVERSITY**BE - SEMESTER-VII (NEW) EXAMINATION – WINTER 2023****Subject Code:3170908****Date:12-12-2023****Subject Name: Switchgear 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) What are the merits and demerits of electromagnetic relays?	03
	(b) Explain the basic connection of trip circuit.	04
	(c) Explain the construction and working of an over current relay.	07
Q.2	(a) Define the following terms as applied to protective relays. 1. Burden 2. Pick-up 3. Reach	03
	(b) With neat sketch explain the ring main protection.	04
	(c) Explain directional over current relay with neat sketch. Also draw the phasor diagram for 30°, 60° and 90° connection.	07
	OR	
	(c) Explain the method of protecting bus-bars using differential relaying.	07
Q.3	(a) With neat sketch explain harmonic restraint.	03
	(b) Discuss Bus Zone protection	04
	(c) Draw the single line diagram of differential bus protection and explain the same. What are its limitations? How can they be overcome?	07
	OR	
Q.3	(a) Explain “under reach” and “over reach” of distance relay.	03
	(b) Discuss the reverse power protection of generator.	04
	(c) Discuss the Buchholz relay for the power transformer protection.	07
Q.4	(a) Discuss the following term relation to circuit breaking: (1) Rated Breaking Capacity (2) Rated Making Capacity (3) Rated Operating Duty	03
	(b) Discuss the energy balance theory of arc interruption in circuit breaker.	04
	(c) Explain with neat sketch the power line carries current protection.	07
	OR	
Q.4	(a) Explain following motor protection for the fault against (1) Overload (2) Unbalanced supply voltages including single phasing.	03
	(b) Write note on microprocessor based over current relay.	04
	(c) Explain stator inter-turn fault protection for generator.	07
Q.5	(a) Explain Auto reclosing.	03
	(b) Explain resistance switching.	04
	(c) With the help of a block diagram, explain the organization of a numerical relay.	07

OR

- Q.5** (a) What is the different between measuring CT and protection CT? **03**
- (b) Explain: (1) Symmetrical and Asymmetrical Breaking Capacity of C.B. **04**
(2) Rated Making capacity of circuit breaker.
- (c) Discuss the operating principle of SF₆ circuit breaker and what its advantages is over other circuit breaker. **07**
