Enrolment No./Seat No_____

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER–VII (NEW) EXAMINATION – SUMMER 2024

Subject Code:3170908 Date:24-05-2024

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)**	Define "Zones of protection"? Draw the block diagram of protective zones.	**03**
	(b)	Draw a "Trip Circuit" including CT, relay, battery, CB and explain briefly.	**04**
	(c)	Explain three stepped distance protection of transmission line.	**07**
Q.2	**(a)**	"Reach of over current relay varies with source impedance". Why?	**03**
	(b)	Explain TMS and PSM for IDMT relays.	**04**
	(c)	Explain the various characteristics of over current relays.	**07**
		OR	
	(c)	What are the incipient faults? Discuss The protection provided in transformers for such faults.	**07**
Q.3	**(a)**	"Percentage differential relay overcomes the drawbacks of simple differential relay". How?	**03**
	(b)	Discuss effect of power swing on distance relays using R-X diagram.	**04**
	(c)	Explain mho relay showing its characteristics on R-X diagram.	**07**
		OR	
Q.3	**(a)**	List various types of faults and abnormal conditions in transformers.	**03**
	(b)	Explain harmonic restrain relay.	**04**
	(c)	Describe the percentage differential protective scheme for transformer.	**07**
Q.4	**(a)**	Compare non unit protection with unit protection.	**03**
	(b)	Describe protection against loss of excitation in generator briefly.	**04**
	(c)	Explain the protection scheme for stator inter-turn faults of a generator.	**07**
		OR	
Q.4	**(a)**	Define : (i) CT Burden, (ii) CT ratio error, (iii) CT phase angle error	**03**
	(b)	Explain induction motor protection against single phasing.	**04**
	(c)	Explain the capacitor voltage transformer with CVT circuit diagram.	**07**
Q.5	**(a)**	Define: (i) Re-striking voltage (ii) Recovery voltage (iii) RRRV.	**03**
	(b)	Explain energy balance theory of arc interruption in a.c. circuit breaker.	**04**
	(c)	Describe SF6 Circuit Breaker with a neat sketch,	**07**
		OR	
Q.5	**(a)**	What do you know by term "adaptive relaying"? Explain.	**03**
	(b)	Discuss the various high resistance arc interruption methods.	**04**
	(c)	Draw and explain the general block diagram of numerical relay.	**07**