Enrolment No./Seat No_____

GUJARAT TECHNOLOGICAL UNIVERSITY

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

Subject Code:3170908 **Date:04-12-2024**

Subject Name: Switchgear And Protection

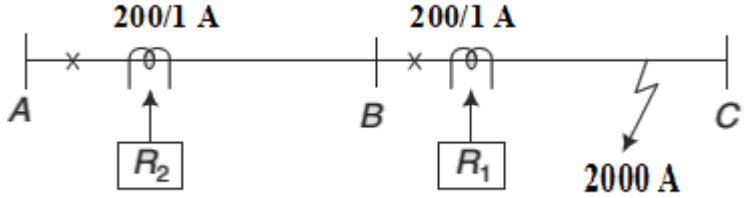
Time:10:30 AM TO 01:00 PM **Total Marks:70**

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)**	Define: 1) Pick up 2) Reach 3) Energizing quantities. .	**03**
	(b)	Explain state different abnormalities occurred in power system.	**04**
	(c)	Explain basic tripping circuit with appropriate diagram.	**07**
Q.2	**(a)**	What is protective relay? Explain its function in an electrical system.	**03**
	(b)	Classify the different types of relay.	**04**
	(c)	Explain essential qualities of protective relaying.	**07**
		OR	
	(c)	Two relays R1 and R2 are connected in two sections of a feeder as shown in Fig. CTs are of ratio 200/1 A. The fault current is 2000A. The plug setting of relay R1 is 100% and R2 is 125%. The operating time characteristics of the relays is as given in Table The time multiplier setting of the relay R1 is 0.2. The time grading scheme has a discriminative time margin of 0.5s between the relays. Find the actual operating times of R1and R2.What is the time multiplier setting (TMS) of R2.	**07**

PSM	2	3.6	5	8	10	20
Operating time (sec)	10	6	3.9	3.15	2.8	2.1



Q.3	**(a)**	Define PSM and TMS with reference to IDMT relay.	**03**
	(b)	What is back up protection and why is it needed? Also explain different type of backup protection	**04**
	(c)	What is the effect of fault resistance on the reach of various distance relays? Which relay is the most affected and which the least affected?.	**07**
		OR	
Q.3	**(a)**	Discuss zone of protection.	**03**
	(b)	What factors cause spill current on external fault in case of transformer differential protection?	**04**
	(c)	Draw R-X diagrams for the following distance relays. (i) Impedance relay (ii) Mho relay (iii) Reactance relay	**07**

Q.4	**(a)**	State different types of over current relays.	**03**
	(b)	What are the drawbacks, if any, of over-current relays?	**04**
	(c)	Describe simple differential protection of 3-phase delta-star type transformer.	**07**

OR

Q.4	**(a)**	Draw a neat sketch of an induction disc relay and discuss its operating principle.	**03**
	(b)	Discuss the protection employed against loss of excitation of an alternator?	**04**
	(c)	Describe in brief the different abnormalities and fault that occurs in three phase Induction motor.	**07**

Q.5	**(a)**	What do you mean by ratio correction factor in CTs? Derive an expression for the same.	**03**
	(b)	State advantages of Numerical relay.	**04**
	(c)	Explain different arc quenching methods used in circuit breakers.	**07**

OR

Q.5	**(a)**	Explain CT burden. How is it specified?	**03**
	(b)	Draw block diagram of numerical relay.	**04**
	(c)	Discuss difference between Measuring CT and Protective CT in detail.	**07**

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