Seat No.: _____ Enrolment No.

GUJARAT TECHNOLOGICAL UNIVERSITY

BE- SEMESTER–VII (NEW) EXAMINATION – WINTER 2020

Subject Code:2170908 **Date:21/01/2021**

Subject Name:Switch Gear and Protection

Time:10:30 AM TO 12:30 PM **Total Marks: 56**

Instructions:

1. **Attempt any FOUR questions out of EIGHT questions.**
2. **Make suitable assumptions wherever necessary.**
3. **Figures to the right indicate full marks.**

			MARKS
Q.1	**(a)**	Define Following: -Under reach and over reach of relay -Plug setting multiplier -Burden	**03**
	(b)	Explain Following with reference to Circuit Breaker: (a) Breaking Current (b) Making Current	**04**
	(c)	Discuss various zones of protection for a modern power system. Explain primary and back-up protection.	**07**
Q.2	**(a)**	Explain in brief, how the percentage differential relay overcomes the drawbacks of simple differential relay.	**03**
	(b)	What is power swing in power system? Evaluate performance of distance relay in case of a power swing.	**04**
	(c)	A 10 MVA, 13.2 kv generator is protected by restricted earth fault protection. The relay is set to operate on 20% out of balance current. If 85% of the generator winding is supposed to be protected by the relay, find out value of resistance to be added in the neutral circuit.	**07**
Q.3	**(a)**	Why does a generator needed to be tripped in the case of loss of excitation?	**03**
	(b)	Explain following with respect to induction motor protection: (a) Single phasing (b) ground fault	**04**
	(c)	Explain with neat diagram: construction and working of the numerical relay.	**07**
Q.4	**(a)**	Explain why the first ground fault on the rotor does not cause any damage while a second fault can be catastrophic.	**03**
	(b)	Explain following with respect to a circuit breaker: Resistance switching Arc chopping	**04**
	(c)	Draw and explain protection of generator against unbalanced loading.	**07**
Q.5	**(a)**	Why can the secondary of a protection CT not to be open circuited?	**03**
	(b)	Discuss the effects of arc resistance on impedance based protection scheme.	**04**
	(c)	Drew and explain carrier current based transmission line protection scheme.	**07**

Q.6	**(a)**	What is the need of sample and hold circuit in a digital numeric relay?	**03**
	(b)	What is single phasing in Induction motor? How protection against single phasing is provided?	**04**
	(c)	Compare Impedance relay, reactance relay and mho/ offset mho relay for transmission line protection.	**07**
Q.7	**(a)**	Compose a suitable choice of circuit breakers for the following voltage ranges with appropriate reason. (a) 3.3kV to 33kV, (b) 400kV to 760kV.	**03**
	(b)	List important protections provided in a 100MW generator and explain harmonic restrain relay.	**04**
	(c)	In what manner the CTs are connected for biased differential protection of transformer having (i) delta-star connection. (ii) star-star connection. Give reason for the CT Connections employed.	**07**
Q.8	**(a)**	Give difference between measurement CT and protection CT.	**03**
	(b)	Explain Restricted Earth Fault Protection for generator in detail.	**04**
	(c)	Compare SF6 circuit breaker with Air blast circuit breaker.	**07**

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