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GUJARAT TECHNOLOGICAL UNIVERSITY

PDDC SEMESTER V– EXAMINATION – SUMMER 2017

Subject Code:X50904 Date: 06/05/2017

Subject Name: SWITCHGEAR

Time: 02.30PM to 05.00PM Total Marks: 7

Instructions:

1. **Attempt all questions.**
2. **Make suitable assumptions wherever necessary.**
3. **Figures to the right indicate full marks.**

Q.1	**(a)**	Explain slepain's theory of arc interruption and discuss its limitations. How does energy balance theory explain the process of arc extinction?	**07**
	(b)	Discuss the following term with reference to circuit breaking: 1) Rated Breaking capacity 2) Rated Making capacity 3) Rated Operating Duty	**07**
Q.2	**(a)**	Distinguish clearly between recovery voltage and restriking voltage and explain the significance of RRRV in the operation of circuit beaker.	**07**
	(b)	Explain capacitor switching duty the a circuit breaker has to perform.	**07**
		OR	
	(b)	Explain the principle, construction of vacuum circuit breakers. Also state the merits of VCBs.	**07**
Q.3	**(a)**	With neat diagram explain the principle of synthetic testing of circuit breaker. State its advantages.	**07**
	(b)	Explain working principle, construction, applications of HVDC circuit breaker.	**07**
		OR	
Q.3	**(a)**	Explain Out of phase switching.	**07**
	(b)	Explain interruption of short line faults by circuit breaker	**07**
Q.4	**(a)**	Derive the equation of critical resistance in resistance switching.	**07**
	(b)	State the various tests carried out to prove the ability of a circuit breaker. Distinguish between type tests and routine tests.	**07**
		OR	
Q.4	**(a)**	Explain the construction, working principle , merits and demerits of air break circuit breaker	**07**
	(b)	In a 132 KV power system the series inductive reactance and capacitance per phase up to the location of circuit breaker is 6Ω and 0.015 µF respectively. A resistance of 600 Ω is connected across the contacts of circuit breaker. Determine the following when the circuit breaker opens: (i) Natural frequency of transient oscillations. (ii) Damped frequency of oscillations (iii)Critical value of damping resistance, which will give no transient oscillations.	**07**
Q.5	**(a)**	Explain the construction, working principle, merits and demerits of minimum oil circuit breaker.	**07**
	(b)	Explain the construction, working principle , merits and demerits of air blast circuit breaker	**07**
		OR	

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Q.5	**(a)**	Explain the construction, working principle of Puffer type SF6 circuit breaker with neat diagram.	**07**
	(b)	Explain the phenomenon of current chopping and its effects on circuit interruption. What measures are taken to reduce it?	**07**

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