Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

PDDC - SEMESTER–V • EXAMINATION – SUMMER • 2014

Subject Code: X 50904 **Date: 02-06-2014**

Subject Name: Switchgear

Time: 02:30 pm - 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.**

Q.1	**(a)**	Discuss the following terms with reference to circuit breaking: **1)** Rated Breaking capacity **2)** Rated Making capacity **3)** Rated Operating Duty	**07**
	(b)	Explain slepain's theory of arc interruption and discuss its limitations. How does energy balance theory explain the process of arc extinction?	**07**
Q.2	**(a)**	Explain a trip circuit diagram for the automatic operation of circuit breaker on fault.	**07**
	(b)	Distinguish clearly between recovery voltage and restriking voltage and explain the significance of RRRV in the operation of circuit beaker.	**07**
		OR	
	(b)	In a 220 KV power system the series inductive reactance and capacitance per phase up to the location of circuit breaker are 8Ω and 0.025 μF respectively. A resistance of 600 Ω is connected across the contacts of circuit breaker. Determine the following when the circuit breaker opens: **(1)** Natural frequency of transient oscillations. **(2)** Damped frequency of oscillations **(3)** Critical value of damping resistance, which will give no transient oscillations.	**07**
Q.3	**(a)**	Explain the construction, working principle of Puffer type SF6 circuit breaker with neat diagram.	**07**
	(b)	Explain the construction, working principle, merits and demerits of air break circuit breaker.	**07**
		OR	
Q.3	**(a)**	Explain the construction, working principle, of Bulk oil circuit breaker with neat diagram.	**07**
	(b)	Discuss the influence of the power factor and circuit conditions on the instantaneous value of recovery voltage.	**07**
Q.4	**(a)**	Explain the construction, working principle, merits and demerits of air blast circuit breaker.	**07**
	(b)	Explain the principle, construction of vacuum circuit breakers. Also state the merits of VCBs.	**07**
		OR	
Q.4	**(a)**	Explain the construction, working principle, merits and demerits of minimum oil circuit breaker.	**07**
	(b)	Explain the following duties which a circuit breaker has to perform: (i) Interruption of terminal faults. (ii) capacitor switching.	**07**
Q.5	**(a)**	How breaking and making capacity of a circuit breaker is tested in a laboratory type of short circuit testing station?	**07**
	(b)	Explain Classification of restriking transients	**07**
		OR	
Q.5	**(a)**	What are the various methods of indirect testing? Describe unit testing.	**07**
	(b)	State the various tests carried out to prove the ability of a circuit breaker. Distinguish between type tests and routine tests.	**07**

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