Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

PDDC - SEMESTER–VI - EXAMINATION – Winter 2016

Subject Code: X60903 **Date:22/10/2016**

Subject Name: High Voltage Engineering

Time: 10.30 am - 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.**

Q.1	**(a)**	Define Townsend's first and second ionization coefficients. How is the condition for breakdown obtained in a Townsend discharge?	**07**
	(b)	Explain Cavity breakdown in liquid dielectries.	**07**
Q.2	**(a)**	Explain the 'Treeing & Tracking' in solid insulating materials.	**07**
	(b)	Explain corona discharges.	**07**
		OR	
	(b)	Discuss the 'Charge Simulation Method' for solving field problems and estimation of potential distribution.	**07**
Q.3	**(a)**	Expain the ageing and breakdown due to Partial Discharges in solid insulation.	**07**
	(b)	Explain Electronic breakdown in liquids.	**07**
		OR	
Q.3	**(a)**	Describe the constuction and working of Van de Graff generator with its applications.	**07**
	(b)	Explain the different schemes for cascade connection of transformers for producing very high ac voltages.	**07**
Q.4	**(a)**	Explain the high voltage Schering bridge for the tan δ and capacitance measurement of insulators or bushings.	**07**
	(b)	Explain the radio interference voltage measurements for EHV power apparatus.	**07**
		OR	
Q.4	**(a)**	Explain the sphere gap measurements.	**07**
	(b)	Explain the principle and construction of an electrostatic voltmeter for high voltage measurements with its merits and demerits.	**07**
Q.5	**(a)**	Explain the resonant transformers.	**07**
	(b)	A Cockcroft-Walton type voltage mulatiplier has ten stages with capacitances, all equal to 0.06 μF. The supply transformer secondary voltage is 100 KV at frequency of 150 Hz. If the load current to be supplied is 1 mA, find (a) ripple voltage, (b) percentage ripple, (c) voltage drop, (d) voltage regulation, (e) the optimum number of stages for minimum regulation.	**07**
		OR	
Q.5	**(a)**	What are the causes of switching and power frequency overvoltages? How are they controlled in power systems?	**07**
	(b)	What is meant by insulation co-ordination? How are the protective devices chosen for optimal insulation level in power system?	**07**

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