Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER– VIII EXAMINATION – WINTER 2014

Subject Code: 180805 **Date:25/11/2014**

Subject Name: HIGH VOLTAGE ENGINEERING

Time: 02.30pm – 05.00pm **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)**	What are " Treeing" & "Tracking"? Explain clearly the two processes in solid dielectrics.	**07**
	(b)	Describe with a neat sketch, the working of a Van de Graff generator. What are the factors that limit the maximum voltage obtained ?	**07**
Q.2	**(a)**	State and explain Paschen's law with the help of characteristics curve.	**07**
	(b)	Explain with neat diagram the principle of operation of an Electrostatics Voltmeter. Discuss its advantages and limitations for high voltage measurements.	**07**
		OR	
	(b)	A ten stage Cockroft-Walton circuit has all capacitors of 0.06 μF. The secondary voltage of the supply transformer is 100 KV at a frequency of 150 Hz. If the load current is 1mA, determine (i) Voltage regulation, (ii) the ripple, (iii) the optimum number of stages for maximum output voltage. (iv) the maximum output voltage.	**07**
Q.3	**(a)**	What is meant by insulation co-ordination ? How are the protective devices chosen for optimal insulation level in a power system ?	**07**
	(b)	Draw the layout of High voltage Laboratory & write the specification of High voltage laboratory equipments.	**07**
		OR	
Q.3	**(a)**	Explain the various theories that explain breakdown in commercial liquid dielectrics.	**07**
	(b)	Explain how a sphere gap can be used to measure the peak value of voltages. What are the parameters and factors that influence such voltage measurement ?	**07**
Q.4	**(a)**	What do understand by electronegative gases? Justify the statement "breakdown strength of electronegative gases is more than that of other insulating gases".	**07**
	(b)	Explain the working of a five stage Cockroft –Walton voltage multiplier circuit for generation of high D.C voltages. Draw the circuit diagram of the generator.	**07**
		OR	
Q.4	**(a)**	What is the principle of operation of a resonant transformer? How is it advantageous over the Cascade connected transformer?	**07**
	(b)	Define the front and tail times of an impulse wave. What are the tolerances allowed as per the specifications?	**07**
Q.5	**(a)**	Explain high voltage Schering bridge for measurement of capacitance and Tan δ of an insulator.	**07**
	(b)	What is partial discharge? Explain partial discharge testing on cables.	**07**

OR

Q.5	**(a)**	What is Vacuum? Discuss the various mechanisms of vacuum breakdown.	**07**
	(b)	Give the Marx circuit arrangement for multistage impulse generators. How is the basic arrangement modified to accommodate the wave time control resistance?	**07**

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