Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER–VIII • EXAMINATION – SUMMER 2013

Subject Code: 180805 **Date: 09/05/2013**

Subject Name: High Voltage Engineering

Time: 10:30 am TO 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 Townsendôs first and second ionization co-efficient. In an experiment in certain gas it was found that the steady state current is 6.5 x 10^{-8}A, at 8kV at a distance of 0.4 cm between the plane electrodes keeping the field constant and reducing the distance to 0.1 cm results in a current of 6.5 x 10^{-9}A. Calculate Townsendôs primary ionization coefficient Ŭ. **07**

(b) Explain the various theories that explain breakdown in commercial liquid dielectrics. **07**

Q.2 **(a)** State and explain Paschenôs law with the help of characteristics curve. **07**

(b) Explain liquid purification system with test cell. **07**

OR

(b) What do understand by electronegative gases? Justify the statement ñ breakdown strength of electronegative gases is more than that of other insulating gases. **07**

Q.3 **(a)** Explain the working of a five stage Cockcroft ï Walton voltage multiplier circuit for generation of high d.c voltages. Draw the circuit diagram of the generator. **07**

(b) Draw & 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**

OR

Q.3 **(a)** What is Tesla coil? Draw the equivalent circuit and its output waveform also derive the equation of output voltage. **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.4 **(a)** A 500kV Cockcroft Walton voltage multiplier circuit has the following circuit components: **07**

No load output voltage = 500kV dc.
Frequency = 150Hz.
No.of stages = 22.
Load Current = 2.5mA.
Stage Capacitor = 1 µF.
Determine the magnitude of ripple voltage and d.c voltage drop under full load condition.

(b) What is the principle of operation of a resonant transformer? How is it advantages over the Cascade connected transformer? **07**

OR

Q.4 **(a)** Explain principle & construction of Electro ï Static Voltmeter. Discuss its merits & demerits. **07**

	(b)	Explain high voltage Schering bridge for measurement of capacitance and tanŭ of an insulator.	**07**
Q.5	**(a)**	Explain the different electrical tests done on isolators and circuit breakers.	**07**
	(b)	A 12 stage impulse generator has 0.126 µF capacitors. The wave front and the wave tail resistances connected are 800 ohms and 5000 ohms respectively. If the load capacitor is 1000pF, find the front and tail times of the impulse wave produced.	**07**

OR

Q.5	**(a)**	What is meant by insulation co-ordination? How are the protective devices chosen for optimal insulation level in a power system?	**07**
	(b)	What is partial discharge? Explain partial discharge testing on cables.	**07**

****