Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

BE – SEMESTER – VIII.EXAMINATION – WINTER 2016

Subject Code: 180805 Date: 22/10/2016

Subject Name: High Voltage Engineering (Department Elective - II)

Time: 02:30 PM to 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)** Why is a Cockcroft-Walton circuit preferred for voltage multiplier circuits? Explain its working with a schematic diagram. **07**

(b) Give the Marx circuit arrangement for multistage impulse generators. How is the basic arrangement modified to accommodate the wave time control resistances? **07**

Q.2 **(a)** Describe, with a neat sketch, the working of a Van de Graff generator. What are the factors that limit the maximum voltage obtained? **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

(b) Cockcroft Walton type voltage multiplier has 10 stages with capacitances, all equal to 0.06 μF. The supply transformer secondary voltage is 100kV at a frequency of 150Hz. If the load current to be supplied is 1mA. Find **07**

a) the % ripple
b) the regulation
c) The optimum no. of stages for minimum regulation or voltage drop.

Q.3 **(a)** Define the Townsend first & second ionization co-efficient. Also derive the equation for second ionization co-efficient? **07**

(b) State and explain Paschen's law with the help of characteristics curve. **07**

OR

Q.3 **(a)** 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**

(b) What are "Treeing" & "Tracking"? Explain clearly the two processes in solid dielectrics. **07**

Q.4 **(a)** Explain high voltage Schering Bridge for measurement of capacitance and tanδ of an insulator. **07**

(b) Explain the principle and construction of an electrostatic voltmeter for very high Voltages. What are its merits and demerits for high voltage a.c. measurements? **07**

OR

Q.4 **(a)** Draw the layout of High voltage Laboratory & write the specification of High voltage laboratory equipments. **07**

(b) What is meant by Insulation Coordination? How are the protective device chosen for Optimal Insulation Level in power system? **07**

Q.5 **(a)** Give different circuits that produce impulse waves explaining clearly their relative merits and demerits. **07**

(b) Explain High voltage Test on insulator. **07**

OR

Q.5 **(a)** What is the principle of operation of a resonant transformer? How it is advantageous over the cascade connected transformers? **07**

(b) Define the front and tail times of an impulse wave. What are the tolerances allowed as per the specifications? **07**

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