

GUJARAT TECHNOLOGICAL UNIVERSITY**BE - SEMESTER-VIII (OLD) - EXAMINATION – SUMMER 2017****Subject Code:180805****Date:04/05/2017****Subject Name: High Voltage Engineering (Department Elective - II)****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) Give the Marx circuit arrangement for multistage impulse generators. How is the basic arrangement modified to accommodate the wave time control resistances? **07**
- (b) Why is a Cockcroft-Walton circuit preferred for voltage multiplier circuits? Explain its working with a schematic diagram. **07**
- Q.2** (a) Define the Townsend's first & second ionization co-efficients. Also derive the equation for second ionization co-efficient. **07**
- (b) Cockcroft-Walton type voltage multiplier has 10 stages with capacitances, all equal to $0.06 \mu\text{F}$. The supply transformer secondary voltage is 100kV at a frequency of 150Hz. If the load current to be supplied is 1mA. Find **07**
- a) % Voltage regulation.
 - b) The ripple voltage.
 - c) The optimum no. of stages for maximum output voltage.
- OR**
- (b) A 12 stage impulse generator has $0.126 \mu\text{F}$ 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**
- Q.3** (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) What is Tesla coil? Draw the equivalent circuit and its output waveforms. Also derive the equation of output voltage. **07**
- OR**
- Q.3** (a) Explain the different electrical tests done on isolators and circuit breakers. **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) Explain high voltage Schering Bridge for measurement of capacitance and $\tan\delta$ of an insulator. **07**
- (b) What are "Treeing" & "Tracking"? Explain clearly the two processes in solid dielectrics. **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) State and explain Paschen's law with the help of characteristics curve. **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) Explain Purification & Breakdown Tests for Liquid Dielectric. **07**
