

**GUJARAT TECHNOLOGICAL UNIVERSITY****BE -VIII SEMESTER– • EXAMINATION – SUMMER 2015****Subject Code: 180805****Date: 05/05/2015****Subject Name: High Voltage Engineering****Time: 10.30am-1.00pm****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) Define the Townsend first & second ionization co-efficient. Also derive the equation for second ionization co-efficient  $I = I_0 e^{\alpha d} / (1 - \gamma (e^{\alpha d} - 1))$  **07**
- (b) Why is a Cockcroft – Walton circuit preferred for voltage multiplier circuits? Explain its working with a schematic diagram **07**
- Q.2** (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**
- OR**
- (b) What are the special features of epoxy resin insulation? **07**
- Q.3** (a) Discuss Various types of Over Voltages in power system. Explain their causes and impact on system equipment. **07**
- (b) What is Tesla Coil? Explain its Working Principle. **07**
- OR**
- Q.3** (a) A Cockcroft Walton voltage multiplier circuit has the following circuit components: **07**
- Secondary voltage = 100kV dc.  
Frequency = 150Hz.  
No. of stages = 10.  
Load Current = 1mA.  
Stage Capacitor = 0.06  $\mu$ F.
- Determine the (i) voltage regulation (ii) ripple (iii) optimum no of stages for maximum output voltage (iv) maximum output voltage
- (b) What are “Treeing” & “Tracking”? Explain clearly the two processes in solid dielectrics. **07**
- Q.4** (a) Explain Purification & Breakdown Tests for Liquid Dielectric. **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**
- OR**
- Q.4** (a) 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**
- (b) Explain with neat diagram the principle of operation of an Electrostatics Voltmeter. Discuss its advantages and limitations for high voltage measurements. **07**
- Q.5** (a) Explain working of Marx Circuit. **07**
- (b) Explain High voltage Tests on Transformers. **07**
- OR**
- Q.5** (a) What is the need to Standardize Impulse Wave for Impulse Testing? Define the front and tail times of an impulse wave. What are the tolerances allowed as per the IS standard? **07**
- (b) Discuss measurement of Dielectric Constant & Loss tangent of capacitor and also derive the equation for the same. **07**

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