Seat No.: _____ **Enrolment No._____**

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER–VI- EXAMINATION – SUMMER 2016

Subject Code:160904 **Date:17/05/2016**

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)**	What is meant by insulation co-ordination? Draw volt-time characteristics for transformer, rod gaps and surge diverters.	**07**
	(b)	Explain briefly the procedure associated with charge simulation method. Discuss its advantages and limitations.	**07**
Q.2	**(a)**	Explain the construction and working of Cockcroft-Walton circuit with a schematic diagram. Also derive the expression for ripple in output voltage.	**07**
	(b)	Describe with a neat sketch the working of a Van de Graph generator. What are the factors that limit the maximum voltage obtained?	**07**
		OR	
	(b)	Explain Townsend's criterion for breakdown and develop its current growth equation.	**07**
Q.3	**(a)**	What is trigatron gap? Explain the function and operation. Also draw the tripping circuit and explain.	**07**
	(b)	A 12-stage impulse generator has capacitors each rated at 0.3 µF, 150 kV. The capacitance of the test specimen is 400 pF. Determine the wave front and wave tail resistances to produce 1.2/50 µ sec. impulse wave.	**07**
		OR	
Q.3	**(a)**	Explain with neat diagram the principle of operation of series resonant circuits for generating high a.c. voltages. Discuss their advantages and disadvantages.	**07**
	(b)	List out the theories for breakdown in Liquids. Explain Cavitation and bubble theory in detail.	**07**
Q.4	**(a)**	Draw and Explain the layout of H.V. voltage laboratory. What are the precautions to be taken for the safety?	**07**
	(b)	Explain capacitance voltage transformer with its schematic representation, equivalent circuit & its phasor diagram.	**07**
		OR	
Q.4	**(a)**	What are “Treeing” and “Tracking”? Explain and compare the two processes in solid dielectrics.	**07**
	(b)	Explain the lightning mechanism including leader and return stroke with appropriate diagrams.	**07**
Q.5	**(a)**	Draw Chubb-fortescue circuit for measurement of peak value of A.C. voltages and discuss its source of errors. Also give its advantages compared to other methods.	**07**
	(b)	Discuss advantages and disadvantages of voltage measurement by sphere gaps. Also discuss factors affecting voltage measurement by sphere gaps.	**07**
		OR	
Q.5	**(a)**	What is non-destructive testing of materials? Explain the P.D. measurement method with suitable diagrams.	**07**

(b) State and explain Paschen's law. How do you account for the minimum voltage for breakdown under a given pd condition? **07**

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