Seat No.:	Enrolment No.
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## **GUJARAT TECHNOLOGICAL UNIVERSITY**

**BE - SEMESTER-VI • EXAMINATION - SUMMER • 2015** 

Subject Code: 160904			Date:14/05/2015	
Ti	-	t Name: High Voltage Engineering 10.30am-01.00pm Total Marks: 7 ons:	70	
	2	<ul><li>Attempt all questions.</li><li>Make suitable assumptions wherever necessary.</li><li>Figures to the right indicate full marks.</li></ul>		
Q.1	(a)	Define Townsend's first and second ionization coefficients. Obtain current growth	07	
	<b>(b)</b>	equation due to first and second ionization.  Describe the working of a Van de Graff generator with a neat sketch.	07	
Q.2	(a)	Describe the principle of Generating Voltmeter operation. List out advantages and disadvantages of Generating Voltmeter.	07	
	<b>(b)</b>	Explain Corona discharge.	07	
	<b>(b)</b>	<b>OR</b> Define and explain the terms: Statistical time lag, formative time lag, total time.	07	
Q.3	(a) (b)	Explain intrinsic breakdown mechanism of solid dielectric material. A solid dielectric material of dielectric strength of 6.0 has an internal void of thickness 1 mm. The specimen is 1 cm thick and is subjected to rms voltage of 10 kV. If the void is filled with air (breakdown strength of air = 3 kV/mm), give remark on occurrence of internal discharge.	07 07	
Q.3	(a) (b)	Explain cultivation and the bubble theory for breakdown of liquid dielectric. The capacitive voltage divider is used in electrostatic voltmeter for measurement of high voltage ac. A three terminal standard compressed air capacitor of $1 \mu F$ are available. If $100 V$ ac voltmeter is connected across mica capacitor, what will the maximum available reading of voltmeter? Ignore capacitance of meter.	07 07	
Q.4	(a)	Explain cascade transformer unit with isolating transformers for high alternating	07	
	<b>(b)</b>	voltage generation.  How sphere gap can be used to measure the peak value of voltages. What are the parameters and factors that influence such voltage measurement?  OR	07	
Q.4	(a)	What is the principle of operation of a resonant transformer? List out its	07	
	<b>(b)</b>	advantages and disadvantages of it.  Describe hall generator for measuring high dc currents.	07	
Q.5	(a) (b)	Explain the mechanism of lightning strokes. Explain the high voltage schering bridge for tan $\delta$ and capacitance measurement of insulators.	07 07	
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Q.5	(a) (b)	Briefly explain how partial discharges in insulation can be detected and display. Explain the insulation testing of insulators.	07 07	