

GUJARAT TECHNOLOGICAL UNIVERSITY
BE - SEMESTER-VIII EXAMINATION – WINTER 2015

Subject Code:180805**Date:12/12/2015****Subject Name: High Voltage Engineering****Time: 2:30pm to 5:00pm****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) Why is a Cockcroft – Walton circuit preferred for voltage multiplier circuits? **07**
Explain its working with a schematic diagram.
- (b) Explain the importance of High Voltage Laboratory. Discuss Layout of High Voltage Laboratory with typical Equipment Specifications **07**
- Q.2** (a) Explain the difference between photo- ionization and photo-electric emission **07**
- (b) What is “stressed oil volume theory”, how does it explain breakdown in large volumes of commercial liquid dielectrics? **07**
- OR**
- (b) Define Townsend’s first and second ionization co-efficient. A steady current of 600 μA flows through the plane electrode separated by a distance of 0.5 cm when a voltage of 10 kV is applied. Determine the Townsend’s first ionization coefficient if a current of 60 μA flows when the distance of separation is reduced to 0.1 cm and the field is kept constant at the previous value. **07**
- Q.3** (a) Explain High voltage Tests on Transformers. **07**
- (b) What are the special features of epoxy resin insulation? **07**
- OR**
- Q.3** (a) What is Tesla coil? Draw the equivalent circuit and its output waveform Also derive the equation of output voltage. **07**
- (b) Explain the various theories that explain breakdown in commercial liquid Dielectrics. **07**
- Q.4** (a) Compare the use of uniform field electrode spark gap & sphere gap for measuring peak values of voltage. **07**
- (b) What do understand by electronegative gases? Justify the statement “breakdown strength of electronegative gases is more than that of other insulating gases”. **07**
- OR**
- Q.4** (a) A 20kV, 50 Hz Schering bridge has a standard capacitance of 106 μF . In a test on a Bakelite sheet balance was obtained with a capacitance of 0.35 μF parallel with a non-inductive resistance of 318 ohms, the non-inductive resistance in the remaining arm of the bridge being 130 ohms. Determine the equivalent series resistance & capacitance and the p.f of the specimen. **07**
- (b) Explain the different electrical tests done on isolators and circuit breakers **07**
- Q.5** (a) What is partial discharge? Explain partial discharge testing on cables. **07**
- (b) What is Vacuum? Discuss the various mechanisms of vacuum breakdown. **07**
- OR**
- Q.5** (a) Discuss Various types of Over Voltages in power system. Explain their causes and impact on system equipment. **07**
- (b) Write short notes on : (i) Type test (ii) Routine test **07**