GUJARAT TECHNOLOGICAL UNIVERSITY BE - SEMESTER-VIII • EXAMINATION – SUMMER 2014

Subject Code: 180805 Subject Name: High Voltage Engineering Time: 10:30 am TO 01:00 pm Instructions:

Total Marks: 70

Date: 27-05-2014

- 1. Attempt all questions.
- 2. Make suitable assumptions wherever necessary.
- 3. Figures to the right indicate full marks.
- Q.1 (a) A steady current of 600µA flows through the plane electrodes separated by a distance of 07 0.5cm when a voltage of 10kV is applied. Determine the Townsend's first ionization constant (coefficient) if a current of 60µA flows when the distance of separation is reduced to 0.1 cm and the field is kept constant at previous value.
 - (b) Explain the difference between photo- ionization and photo-electric emission. 07
- Q.2 (a) What is Vacuum? Discuss the various mechanisms of vacuum breakdown. 07
 - (b) Why are both electrical & thermal properties important for liquids for use in an 07 apparatus like a transformer?

OR

- (b) What is "stressed oil volume theory", how does it explain breakdown in large volumes 07 of commercial liquid dielectrics?
- Q.3 (a) What are the different methods and means for purification of liquid dielectric? 07
 - (b) Discuss the different methods of measuring high dc voltages. What are the limitations 07 in each method?

OR

- Q.3 (a) What is capacitance voltage transformer? Explain with phasor diagram how a tuned 07 capacitance voltage transformer can be used for voltage measurements in power systems.
 - (b) What is a trigatron gap? Explain its function and operation.
- Q.4 (a) For a High voltage d.c generator using Cockroft- Walton circuit with 4 stages and peak 07 input a.c voltage of 100kV, 200Hz, the load current of 4mA and each stage capacitance of 0.02μ F, calculate the ripple voltage and voltage drop.
 - (b) What is the principle of operation of a resonant transformer? How is it advantages over 07 the Cascade connected transformer?

OR

- Q.4 (a) Compare the use of uniform field electrode spark gap & sphere gap for measuring peak 07 values of voltage.
 - (b) Explain one method of controlled tripping of impulse generators. Why is controlled **07** tripping necessary?
- Q.5 (a) Give the Marx circuit arrangement for multistage impulse generators. How is the basic 07 arrangement modified to accommodate the wave time control resistance?
 - (b) Define the following term.
 - (a) Corona Discharge
 - (b) Loss tangent
 - (c) Impulse ratio

(g) Townsend's first ionization constant.

(d) Partial discharge

(e) Surge impedance

(f) Dielectric strength

OR tas on : (i) Type test (ii) Poutin

Q.5 (a) Write short notes on : (i) Type test (ii) Routine test
(b) Explain in details the H.V Schering bridge. How is it different from low voltage Schering- bridge ?

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