Exam. Code: 0937
Sub. Code: 6992

1079

B. Engg. (Electrical & Electonics Engg.)

7th Semester

EE-711: Electrical Insulation in Power Apparatus and Systems

Time allowed: 3 Hours Max. Marks: 50

NOTE: *Attempt **five** questions in all, including Q. No. 1 which is compulsory and selecting atleast two questions from each Part.*

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1. (i) What are the causes of power frequency voltages in a power system?
   (ii) What is isokeraunic level?
   (iii) What are pure liquid dielectrics?
   (iv) Draw the standard impulse waveforms used in high voltage?
   (v) What are the advantages of CVT measurement in HVAC? (5*2=10)

PART-A

2. (a) Derive an expression for the current in the air gap $i=i_0e^{\alpha d}$ considering townsend first ionization coefficient.

   (b) In an expression in certain gas it was found that the steady state current is $4*10^6$ A at 10 kV at a gap spacing of 0.4 cm between electrodes keeping the field constant and reducing the gap spacing to 0.2 cm and current of $2*10^6$ A was obtained. Calculate the townsend primary ionization coefficient of λ. (5,5)

3. (a) Discuss various mechanisms of vacuum breakdown.

   (b) A Cockroft Walton type voltage multiplier has eight stages with capacitances all are equal to 0.05 μF. The supply transformer secondary voltage 125 kV at a frequency of 125 Hz. If the load current to be supplied is 5.5 mA. Find the % ripple and regulation. (5,5)

4. (a) Discuss construction and working of Van De Graff generator with a neat sketch.
   (b) An impulse current generator has total capacitances of 15 μF, the charging voltage of 125 kV, the circuit inductance of 2 mH and the dynamic resistance is 1 ohm. Determine the peak current and wave shape of the wave. (5,5)

PART-B

5. (a) How is impulse voltage withstand test conducted?

   (b) What are the various methods of measuring high impulse currents? (5,5)

P.T.O.

6. (a) List out various electrical tests conducted for bushings.

(b) Determine the specific heat generated in the test specimen due to dielectric loss if dielectric constant and loss angle of the specimen are 3.8 and 0.0085 respectively. The electric field is 40 kV/cm at 50 Hz.

(5,5)

7. (a) How peak value of voltage is measured using sphere gaps?

(b) Draw a neat diagram of high voltage Schering bridge and analyze it for balanced condition. Draw its phasor diagram. Assume series and parallel equivalent representation of insulating material.

(5,5)

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