Total No. of Questions : 8]

SEAT No. :

P2300

[Total No. of Pages : 3

[5254]-634

B.E. (Electrical)

HIGH VOLTAGE ENGINEERING

(2012 Pattern) (Elective - III) (End Semester)

Time : 2½ Hours] *[Max. Marks : 70*

Instructions to the candidates:

1) ***Answer all questions.***

2) ***Answer Ql or Q2, Q3 or Q4, Q5 or Q6, Q7 or Q8.***

3) ***Neat diagram must be drawn wherever necessary.***

4) ***Figures to the right indicate full marks.***

5) ***Assume suitable data, if necessary.***

6) ***Use of calculator is allowed.***

Q1) a) State and explain Paschens' law and its limitations. **[8]**

b) Explain following breakdown theories for solid dielectrics:

i) Thermal breakdown

ii) Partial Discharge **[8]**

c) In an experiment in a certain gas, it was found that the steady state current is 4.5×10^{-8}A at 8kV at a distance of 0.4 cm between the plane electrodes keeping the field constant and reducing the distance to 0.1cm results in a current of 4.5×10^{-9} A. Calculate Townsend's primary ionization coefficient. If the breakdown occurred when gap distance was increased to 0.9 cm what is the value of secondary ionization coefficient. **[4]**

P.T.O.

OR

Q2) a) Explain various reasons for switching surges. Also state the remedial actions for the same. **[8]**

b) Explain properties of composite dielectrics. Explain long term breakdown theory of composite dielectric. **[6]**

c) Explain any two breakdown theories of commercial liquids. **[6]**

Q3) a) Explain generation of high AC voltage with the help of series and parallel resonance circuit. **[8]**

b) Draw a neat sketch of Marx Circuit arrangement for multistage impulse generators. How is the basic arrangement modified to accommodate the wave time control resistances? **[8]**

OR

Q4) a) Explain the working of three cascade connected transformers used for generation of AC voltages. State its advantages and disadvantages also. **[8]**

b) Explain the generation of High Impulse Current with a suitable diagram. Also describe its main parts. **[8]**

Q5) a) Draw a vertical arrangement of sphere gap used for peak value measurement of the voltage. Clearly show insulator support, sphere shank, operating gear and motor for changing gap distance, HV connection and sparking point. Discuss various factors that affect the spark over voltage of a sphere gap. **[8]**

b) What is dielectric loss and dielectric constant? Explain the method of measurement of dielectric constant and loss factor. **[8]**

OR

Q6) a) State the different methods of partial discharge measurement and explain any one in detail. **[8]**

b) With suitable figure explain the working of capacitance voltage transformer. Also state its advantages. **[8]**

Q7) a) Explain the different test carried on insulators in high voltage testing laboratory. **[9]**

b) Classify the different High voltage laboratories and give salient features of each of them. **[9]**

OR

Q8) a) State and explain the different high voltage tests carried on surge arresters. **[9]**

b) Explain the earthing and shielding of High Voltage Laboratories. **[9]**