

Total No. of Questions : 10]

SEAT No. :

P3093

[Total No. of Pages : 2

[5670]-194
B.E. (Electrical)
High Voltage Engineering
(2012 Pattern) (Semester - II) (Elective - III)

Time : 2½ Hours]

[Max. Marks : 70

Instructions to the candidates:

- 1) *Answer Q.1 or Q.2, Q.3 or Q.4, Q.5 or Q.6, Q.7 or Q.8, Q.9 or Q.10.*
- 2) *Neat diagrams must be drawn wherever necessary.*
- 3) *Figures to the right indicate full marks.*
- 4) *Use of logarithmic tables slide rule, Mollier charts, electronic pocket calculator and steam tables is allowed.*
- 5) *Assume suitable data if necessary.*

Q1) a) Explain the breakdown of gaseous dielectric material in uniform field. State the mathematical equation for breakdown voltage under uniform field accordingly to Townsend's theory and Streamer theory. [5]

b) What is the Suspended particle theory of breakdown phenomenon in liquid dielectric material?. [5]

OR

Q2) a) State properties of composite dielectric system. Explain short term and long term breakdown of composite dielectric material. [5]

b) With mathematical relations, explain Cavitation and Bubble theory of breakdown phenomenon in liquid dielectric material. [5]

Q3) a) Explain partial discharge phenomenon in solid dielectric material. [5]

b) Explain the Treeing and Tracking phenomenon in solid dielectric material. [5]

OR

Q4) a) Explain with mathematical expression, Electro-mechanical breakdown of solid insulating material. Also State Examples of solid insulating material where in Electro-mechanical breakdown can happen. [5]

b) Explain Intrinsic and Electronic breakdown in solid dielectric material.[5]

Q5) a) With neat diagrams, explain the phenomenon of lightening. [8]

b) Explain in short, various theories of charge formation and cloud discharge. [8]

OR

P.T.O.

- Q6)** a) Explain the reasons of occurrence of switching surges. State the methods to minimize the switching surges. [8]
- b) Draw diagrams and explain the statistical approach of insulation coordination with reference to following points; [8]
- i) Probability distribution of Occurrence of over-voltage,
 - ii) Probability distribution of failure of insulation
 - iii) Statistical Safety Factor
 - iv) Concept of Risk of failure

- Q7)** a) With neat diagram, write short note on the use of sphere gap unit for measurement of high voltage. State standard diameters of spheres, material of sphere. [8]
- b) Explain with neat diagram, the working of any two of following circuits for measurement of voltage; [8]
- i) Electrostatic voltmeter
 - ii) Generating voltmeter
 - iii) Capacitance voltage transformer

OR

- Q8)** a) Explain with circuit diagram the measurement of dielectric constant and loss factor. [8]
- b) Explain the use of electro-optical signal converter for measurement of high frequency AC current. [8]

- Q9)** a) Explain the type and routine test performed on following high voltage equipment. [10]
- i) Insulator and bushing
 - ii) Power transformer
- b) Explain the classification of High Voltage laboratory and layouts of High Voltage lab. [8]

OR

- Q10)** a) What are various tests to be performed on surge arrester. [5]
- b) Explain various tests required to be performed on High tension cables. [5]
- c) Explain the safety measures, earthing required and shielding of high voltage lab. [8]

