

Total No. of Questions : 10]

SEAT No. :

P3320

[Total No. of Pages : 2

[5670]-589

B.E. (Electrical)

HIGH VOLTAGE ENGINEERING

(2015 Course) (Semester - II) (403149A) (Elective - III) (End Semester)

Time : 2½ Hours]

[Max. Marks : 70

Instructions to the candidates:

- 1) Write Q1 or Q2, Q3 or Q4, Q5 or Q6, Q7 or Q8, Q9 or Q10.
- 2) Neat diagrams must be drawn wherever necessary.
- 3) Black 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 Townsend breakdown criterion. Also derive the current growth equation in presence of primary process. [5]

b) What is the Pashen's law? What is the significance of $(pd)_{\min}$ value and $(BdV)_{\min}$ value. [5]

OR

Q2) a) What is 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 modified Marx circuit for generation of impulse voltage. [5]

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

OR

Q4) a) Explain with schematic the working of Cascade Transformer for generation of high AC voltage. What is cascading error? [5]

b) How to use three electrode gap mechanism to control the tripping of impulse generator. [5]

P.T.O.

Q5) a) Explain the use of electrostatic volt meter and generating voltmeter for measurement of voltage. [8]

b) Explain the use of electro-optical signal converter for measurement of high frequency AC current. [8]

OR

Q6) a) Explain with circuit diagram the measurement of dielectric constant and loss factor. [8]

b) Explain with circuit diagram the measurement of partial discharge. [8]

Q7) a) With neat diagrams, explain the Wilson theory, Simpson theory. [8]

b) Explain the reasons of over voltage due to switching surges and methods to minimize switching surges. [8]

OR

Q8) a) Explain the lightning phenomenon with elaborating dart leader, stepped leader concepts. [8]

b) With diagrams, 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 and Risk of failure

Q9) a) Explain the type and routine test performed on following high voltage equipment. [10]

i) Power Capacitor

ii) Power transformer

b) Explain various tests required to be performed on High tension cables. [8]

OR

Q10) a) Explain the classification of High Voltage laboratory and layouts of High Voltage lab. [8]

b) Write short note on following points related to high voltage lab:- [10]

i) Safety measures

ii) Earthing required

iii) Shielding of high voltage lab

