

Code No: 117DQ

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JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

B. Tech IV Year I Semester Examinations, November/December - 2016

HIGH VOLTAGE ENGINEERING

(Electrical and Electronics Engineering)

Time: 3 Hours

Max. Marks: 75

Note: This question paper contains two parts A and B.

Part A is compulsory which carries 25 marks. Answer all questions in Part A. Part B consists of 5 Units. Answer any one full question from each unit. Each question carries 10 marks and may have a, b, c as sub questions.

**PART- A**

(25 Marks)

- 1.a) What are the different insulating materials used in Circuit breakers? [2]
- b) Give the classification of solid insulating materials on the basis of operating temperature. [3]
- c) State Paschen's law. [2]
- d) Give the concept of Townsend's criteria of breakdown in gases. [3]
- e) Define rise time and decay time of impulse voltage wave. [2]
- f) What is the working principle of Tesla coil? [3]
- g) What do you mean by back-flashover? [2]
- h) What are the practical characteristics of a surge diverter? [3]
- i) What do you mean by (i) Chopped impulses and (ii) withstand voltage. [2]
- j) State different tests to be conducted on H.V cables. [3]

**PART-B**

(50 Marks)

- 2/ Explain different numerical methods available for estimation of electric field distribution in dielectric media. [10]
- OR
3. How is transformer insulation divided? Briefly indicate the insulation arrangement indicating the insulating materials chosen. [10]
- 4.a) What is Ionization process? Explain different ionization process in detail.
- b) Explain the streamer theory of breakdown in gases. [5+5]
- OR
- 5.a) What is thermal breakdown in solid dielectrics, and how is it practically more significant than other mechanics?
- b) Explain different theories of breakdown in commercial liquids. [5+5]
- 6.a) Explain the different methods of producing switching impulses in test laboratories.
- b) Explain the different methods of high A.C voltage measurements with their relative merits and demerits. [5+5]

OR

7.a) Explain different methods to produce high D.C. voltages. Also, give their advantages and disadvantages.

b) Explain the different methods of measuring high impulse currents with their relative merits and demerits. [5+5]

8.a) What are the mechanisms by which lightning strokes develop and induce overvoltages on Overhead power lines?

b) Explain the importance of switching overvoltages in EHV power systems. [5+5]

OR

9.a) What are the causes for switching and power frequency over voltages?

b) What is meant by Insulation co-ordination? How are the protective devices chosen for optimal insulation level in a power system? [5+5]

10.a) Explain the High voltage Schering Bridge for the measurement of tan δ of bushing.

b) What are the partial discharges and how are they detected under power frequency operating conditions. [5+5]

OR

11.a) What are the different tests done on high voltage circuit breakers? Explain the procedure of each test.

b) What is the procedure of conducting impulse test on high voltage transformers? [5+5]

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