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Question Paper Code : 71511

B.E./B.Tech. DEGREE EXAMINATION, APRIL/MAY 2015.

Sixth Semester

Electrical and Electronics Engineering

EE 2353/EE 63/10133 EE 603 — HIGH VOLTAGE ENGINEERING

(Regulation 2008/2010)

(Common to PTEE 2353/10133 EE 603 – High Voltage Engineering for
B.E. (Part-Time) Fifth Semester – Electrical and Electronics Engineering –
Regulation 2009/2010)

Time : Three hours

Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. What are various abnormalities in a High Voltage system?
2. What are the characteristics of a lightning voltage?
3. What is Townsend's condition for Breakdown?
4. Define statistical time lag and formative time lag.
5. What are differences between a high voltage testing transformer and a power transformer?
6. What do you mean by tracking index?
7. What is the principle behind the operation of generating voltmeter?
8. Calculate the correction factors for atmospheric conditions, if the laboratory temperature is 37°C, the atmospheric pressure is 750 mmHg and the wet bulb temperature is 27°C.
9. What are called type tests?
10. What is BIL?

11. (a) (i) Briefly describe a method of recording the occurrence of lightning in an overhead transmission line. (8)
- (ii) Explain why a steep fronted surge waveform are more vulnerable to insulation. (8)

Or

- (b) Briefly explain, with the aid of suitable diagrams, the statistical method of insulation co ordination.
12. (a) A certain dielectric can be considered to be represented by the equivalent circuit shown in figure 1. What is the maximum voltage that can be applied across the dielectric, if partial discharges in air to be avoided? State any assumptions made.

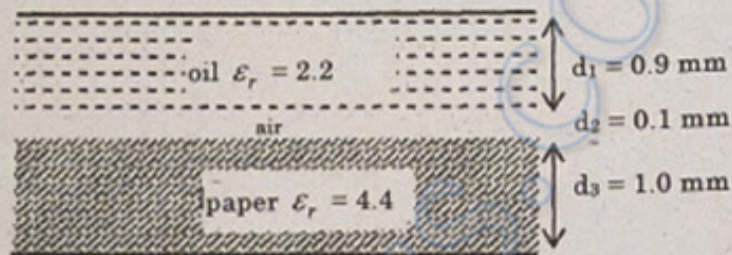


Figure. 1

Or

- (b) From the fundamental principles, derive Townsend's criteria for the breakdown of gaseous dielectric medium.
13. (a) A Cockcroft - Walton type voltage multiplier has eight stages with capacitances equal to $0.05 \mu\text{F}$. The supply transformer secondary voltage is 125 kV at a frequency of 150 Hz. If the load current to be supplied is 5 mA, find (i) the percentage ripple (ii) the regulation and (iii) the optimum number of stages for minimum regulation of voltage drop.

Or

- (b) A six-stage impulse generator designed to generate the standard waveform ($1.2/50 \mu\text{s}$) has a per stage capacitance of $0.06 \mu\text{F}$ to be used to test transformers with an equivalent winding to earth capacitance of 1 nF. A peak output voltage of 550 kV is required for testing the transformer. The wavefront time is to be defined based on 30% and 90% values. With the aid of appropriate calculations select the values of the resistive elements in the circuit to produce the required waveform. State any assumptions made.

14. (a) Explain in detail the various techniques for the measurement of high AC voltages.

Or

(b) With neat sketch explain in detail the various methods used to measure the RMS and peak values of High AC voltages.

15. (a) With neat diagram explain the various HV testing's carried out on Insulators and Bushings.

Or

(b) Explain in sequence the various high voltage tests being carried out in a Power Transformer.

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