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Question Paper Code : 91448

B.E./B.Tech. DEGREE EXAMINATION, NOVEMBER/DECEMBER 2014.

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 is Bewley Lattice Diagram?

2.   State the causes of over voltage in power system.

3.   What is time lag?

4.   Define "Intrinsic strength" of a solid dielectric.

5.   What are the advantages of cascaded transformer units for HVAC generation?

6.   What is a trigatron gap?

7.   What are the conditions to be satisfied by a potential divider for impulse work?

8.   What is the significance of atmospheric correction factor in HV testing?

9.   What is meant by insulation coordination?

10. Define "Creepage distance".

PART B — (5 × 16 = 80 marks)

11. (a) Define surge impedance of a line. Obtain the expression of reflection and transmission of travelling waves at transition points. (16)

Or

(b) A long transmission line is energized by a unit step voltage 1.0 V at the sending end and is open circuited at the receiving end. Construct the Bewley Lattice Diagram and obtain the value of the voltage at the receiving end after a long time. Take the attenuation factor $\alpha = 0.8$. (16)

12. (a) Derive the condition for breakdown in gaseous dielectric and hence obtain Paschen's law. Show the variations of sparking potential with (pd) values and explain for such variations. (16)

Or

(b) (i) Discuss the breakdown mechanism of composite dielectrics. (8)

(ii) Discuss the two important theories of breakdown in commercial liquids. (8)

13. (a) Explain the working principle of Cockroft-Walton voltage multiplier circuit. Derive an expression for total voltage drop and total ripple voltage of n-stage voltage multiplier circuit and hence deduce the condition for optimum number of stages. (16)

Or

(b) What is a tesla coil? Derive an expression for damped high frequency oscillations obtained from a tesla coil. Give its advantages. (16)

14. (a) (i) Explain how a sphere-gap can be used to measure the peak value of high voltage. (8)

(ii) Explain the parameters and factors that influence the sphere-gap in voltage measurements. (8)

Or

(b) (i) Explain Chubb-Fortescue circuit for measurement of peak values of alternating voltage. (8)

(ii) Explain with a neat diagram of Rogowski coil, the principle of operation for measurement of high impulse current. (8)

15. (a) Explain with a neat diagram of synthetic testing of circuit breakers. Why is synthetic testing advantages over direct method for short circuit test?

(16)

Or

(b) What is meant by 50% disruptive discharge as applied to impulse voltage. Discuss the procedure of two important methods to obtain the same.

(16)

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