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C 29731 (Pages : 2) Name..... .....

Reg. No.....

SEVENTH SEMESTER B.TECH. (ENGINEERING) DEGREE EXAMINATION OCTOBER 2012

EE 09 L 13—HIGH VOLTAGE ENGINEERING

(2009 admissions)

Time : Three Hours Maximum : 70 Marks

Part A

Answer all *questions.*

1. Explain the electron attachment process in gas dielectric.
2. How the electrical conduction in liquid differ from that in gases ?
3. What are the different forms of high voltages ?
4. What are the advantages of capacitive voltage transformer ?
5. Draw the equivalent circuit diagram of long transmission line with distribution parameters.

(5 × 2 = 10 marks)

Part B

Answer any four *questions.*

6. What do you mean by 'intrinsic strength' of a solid dielectric ? How does breakdown occur due to electrons in a solid dielectric ?
7. What is composite insulation ? How does short term breakdown differ from long-term breakdown ?
8. Explain impulse current waveform generation using suitable experimental setup.
9. Explain one method of controlled tripping of impulse generators. Why is controlled tripping necessary ?
10. Explain how a sphere gap can be used to measure the peak value of voltages. What are the parameters and factors that influence the voltage measurement ?
11. What is surge arrestor ? Explain its function as a shunt protective device.

(4 × 5 = 20 marks)

Part C

12. Explain the various theories that explain breakdown in commercial liquid dielectrics.

(10 marks)

Or

13. (a) What is thermal breakdown in solid dielectrics and how is it practically more significant than other mechanisms ?

(6 marks)

(b) What will be the breakdown voltage of a spark gap in a gas at Pr = 760 torr at 25°C if A = 15/cm, B = 360/cm, d = 1mm and $\gamma = 1.5 \times 10^{-4}$. And also find the minimum spark over voltage for the given gap.

(4 marks)

14. Why is a Cockcroff-Walton circuit preferred for voltage multiplier circuits ? Explain its working with a schematic diagram.

(10 marks)

Or

15. Give the Marx circuit arrangement for multistage impulse generators. How is the basic arrangement modified to accommodate the wave time control resistances ?

(10 marks)

16. Give the schematic arrangement of an impulse potential divider with an oscilloscope connected for measuring impulse voltages. Explain the arrangement to minimize errors.

(10 marks)

Or

17. What are the different types of resistive shunts used for impulse current measurements ? Discuss their characteristics and limitations.

(10 marks)

18. What are partial discharges and how are they detected under power frequency operating conditions and explain any one method for calibrating partial discharge detectors ?

(10 marks)

Or

19. Explain the terms surge impedance, attenuation and distortion of travelling waves propagating on overhead lines. What is the effect of corona on the transmission line ?

(10 marks)

[4 × 10 = 40 marks]