Reg. No. : | | | | | | | | | | | | |

Question Paper Code : 30585

B.E./B.Tech. DEGREE EXAMINATIONS, NOVEMBER/DECEMBER 2024.

Seventh Semester

Electrical and Electronics Engineering

EE 8701 — HIGH VOLTAGE ENGINEERING

(Regulations 2017)

Time : Three hours Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. What are the causes of over voltages in power system?
2. What are the characteristics of switching surges?
3. What is meant by corona discharge?
4. Write a brief technical note on the maintenance of oil quality.
5. State the principle of Van de graaff generator.
6. What is a Marx circuit?
7. State the principle of generating voltmeter.
8. Write the limitations of sphere gap.
9. What is meant power frequency?
10. Define impulse voltage.

PART B — (5 × 13 = 65 marks)

11. (a) (i) Develop and explain the mathematical model of lightning with necessary equations. (7)

(ii) Describe in detail about the effects of positive and negative corona. (6)

Or

(b) (i) Discuss in detail, the methods of protection against over voltage. (7)

(ii) Discuss the properties of Bewley's lattice diagram. (6)

12. (a) Explain in detail the conduction function in:

(i) Pure liquids (7)

(ii) Commercial liquids. (6)

Or

(b) Describe the breakdown mechanisms in

(i) Solid dielectrics (7)

(ii) Composite dielectrics. (6)

13. (a) (i) Discuss in detail about the generation of high impulse voltage. (7)

(ii) Explain about the generation of high AC voltage with relevant diagrams. (6)

Or

(b) (i) Explain the construction of a cascaded transformer with appropriate diagram. (7)

(ii) Discuss the control methods of impulse generator. (6)

14. (a) (i) Differentiate peak voltmeter and generating voltmeter. (7)

(ii) Discuss the function of capacitor voltage transformer. (6)

Or

(b) Explain in detail the following digital techniques:

(i) Resistance Potential Divider (7)

(ii) Capacitance Potential Divider. (6)

15. (a) (i) Discuss the high voltage testing types of electrical power apparatus as per Indian standards. (7)

(ii) Explain the methods of DC testing of insulators with relevant diagrams. (6)

Or

(b) (i) Describe in detail about insulation coordination. (7)

(ii) Explain any two methods of testing of cables. (6)

PART C — (1 × 15 = 15 marks)

16. (a) An underground cable of inductance 0.150 mH/km and of capacitance 0.2 μF/km is connected to an overhead line having an inductance of 1.2 mH/km and capacitance of 0.006 μF/km. Calculate the transmitted and reflected voltage and current waves at the junction, if a surge of 200 kV travels to the junction,

(i) along the cable (8)

(ii) along the overhead line. (7)

Or

(b) A ten stage Cockraft-Walton circuit has all capacitors of 0.06 μF. The secondary voltage of the supply transformer is 100 kV at a frequency of 150 Hz. If the load current is 1 mA, Determine the following:

(i) voltage regulation (4)

(ii) the ripple (4)

(iii) the optimum number of stages for maximum output voltage (4)

(iv) the maximum output voltage. (3)