Reg. No. : ☐☐☐☐☐☐☐☐☐☐☐☐☐

Question Paper Code : 80569

B.E./B.Tech. DEGREE EXAMINATIONS, APRIL/MAY 2024.

Fourth Semester

Electrical and Electronics Engineering

EE 8402 — TRANSMISSION AND DISTRIBUTION

(Regulations 2017)

Time : Three hours   Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. Define skin effect and proximity effect.

2. List out the applications of self and mutual GMD.

3. Write the significance of power circle diagrams.

4. Define the term 'Critical disruptive voltage'.

5. List out the methods of improving string efficient.

6. Mention the various types of towers.

7. Write down the merits and demerits of underground cables.

8. What is meant by potential gradient?

9. State Kelvin's Law.

10. What is meant by distributor and feeder?

PART B — (5 × 13 = 65 marks)

11. (a) Explain the concept of symmetrical and unsymmetrical spacing between conductors.

Or

    (b) Explain the typical configurations, conductor types and electrical parameters of EHV lines.

12. (a) Explain the pi equivalent circuit and phasor diagram of medium transmission line.

Or

(b) (i) Derive the expression for transmission efficiency and regulation of short transmission line. (7)

(ii) Discuss about the effects of corona. (6)

13. (a) With neat diagrams explain the various types of insulators in detail.

Or

(b) (i) Explain the effects of wind and ice loading. (7)

(ii) Derive the expression for string efficiency. (6)

14. (a) With neat diagram explain the schematic diagram of underground cable and the need for each component in that.

Or

(b) (i) Write short notes on grading of cables. (5)

(ii) Discuss about the capacitance of single core and three core cables. (8)

15. (a) (i) Explain the various types of substations. (7)

(ii) Discuss the techniques of power factor improvement. (6)

Or

(b) Discuss about the need for HVDC and FACTs.

PART C — (1 × 15 = 15 marks)

16. (a) A 2-wire DC distributor AB, 900 m long is fed at A at 400 V and loads of 50 A, 100 A and 150 A are tapped off from C, D and E which are at a distance of 200 m, 500 m, and 800 m from point A respectively. The distributor is also loaded uniformly at the rate of 0,5 A/m. If the resistance of the distributor per m is 0.0001 Ω, calculate voltage at

(i) Point B and (8)

(ii) Point D. (7)

Or

(b) (i) A 3-phase, 50 Hz, 132 kV overhead line has conductors placed in a horizontal plane 4 m apart. Conductor diameter is 2 cm. If the line length is 100 km, calculate the charging current per phase assuming complete transposition. (7)

(ii) The towers of height 30 m and 90 m support a transmission line conductor at water crossing. The horizontal distance between the towers is 500 m. If the tension in the conductor is 1600 kg, find the minimum clearance of the conductor and water and clearance mid-way between the supports, Weight of conductor is 1.5 kg/m. Bases of the towers can be considered to be at water level. (8)