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Question Paper Code : 81282

B.E./B.Tech. DEGREE EXAMINATIONS, NOVEMBER/DECEMBER 2025.

Fourth Semester

Electrical and Electronics Engineering

EE 3401 — TRANSMISSION AND DISTRIBUTION

(Regulations 2021)

Time : Three hours

Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. Differentiate solid and bundle conductor.
2. Define skin effect.
3. What is surge impedance?
4. Define Ferranti effect.
5. Mention the various methods of earthing in substations.
6. What is deviation tower?
7. List the factors to be considered, while selecting a cable, for a particular service.
8. Classify the cables used for three phase service.
9. List out the types of substation.
10. What are the components of a power system?

PART B — (5 × 13 = 65 marks)

11. (a) Derive the expression for inductance of a 3-phase transmission line.

Or

- (b) Derive the expression for capacitance of a single phase transmission line.

12. (a) With the equivalent circuit and phasor diagram explain about the short transmission line. Also derive the expression for voltage regulation and transmission efficiency.

Or

- (b) Explain how ABCD parameters of transmission line help in power system analysis.

13. (a) Derive the expression for calculation of sag
- (i) when supports are equal (5)
 - (ii) when supports are not equal (4)
 - (iii) effect of ice and wind. (4)

Or

- (b) Explain the various methods to improve string efficiency.

14. (a) (i) Derive the expression for dielectric stress of a single core cable. (7)
(ii) Derive the expression for capacitance of a single core cable. (6)

Or

- (b) What are different types of underground cables with neat diagram, explain the constructional features of any two cables?

15. (a) Derive the expression for volume of copper conductor material required for the following distributors.
- (i) Two-wire d.c. system with one conductor earthed (7)
 - (ii) Three-wire d.c. system. (6)

Or

- (b) Explain in detail about the different types of HVDC links used in Distribution System.

PART C — (1 × 15 = 15 marks)

16. (a) A 3-phase transmission line is being supported by three disc insulators. The potentials across top unit (i.e., near to the tower) and middle unit are 10 kV and 12 kV respectively. Calculate
- (i) the ratio of capacitance between pin and earth to the self capacitance of each unit. (5)
 - (ii) line voltage (5)
 - (iii) string efficiency (5)

Or

(b) The towers of height 32 m and 95 m respectively, support a transmission line conductor at water crossing. The horizontal distance between the towers is 600 m. If the tension in the conductor is 1500 kg, find

(i) the minimum clearance of the conductors and water

(ii) 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.
