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Question Paper Code : 20514

B.E./B.Tech. DEGREE EXAMINATIONS, APRIL/MAY 2022.

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. Why transmission lines are transposed? Mention the advantages of transposition of conductors?
2. Calculate the loop inductance per kilometer comprising two parallel conductors 1 m apart and 1cm diameter.
3. List the significance of SIL in transmission line.
4. Draw the phasor diagram to narrate the Ferranti effect.
5. Mention the causes for the failure of insulators.
6. How aeolian vibration occurs in transmission lines and mention the factors affecting it?
7. State the effects of unequal distribution of stress in a cable.
8. Why the potential distribution across the insulator string is not uniform?
9. Compare EHVAC and HVDC transmission system.
10. Classify the substations according to service.

PART B — (5 × 13 = 65 marks)

11. (a) Determine the expression for the capacitance per phase of a three-phase overhead transmission system when the conductors are symmetrically spaced. (13)

Or

- (b) The three conductors of 3-phase overhead line are arranged in a horizontal plane with a spacing of 4 m between adjacent conductors. The diameter of each conductor is 2 cm. Determine the inductance per km per phase of the line assuming that the lines are transposed. (13)

12. (a) Explain the performance of Nominal T, π and End condenser method of medium transmission line. (13)

Or

- (b) Draw the phasor diagram of a short transmission line and derive an expression for voltage regulation and transmission efficiency. (13)

13. (a) In a 33 kV overhead line, there are three units in a string of insulators. If the capacitance between each insulator pin and earth is 11% of self-capacitance of each insulator, find (i) the distribution of voltage over 3 insulators and (ii) string efficiency. (13)

Or

- (b) Derive the expression for determining the voltage distribution in a string of suspension type insulator and calculate the string efficiency. (13)

14. (a) With neat diagram and equations, explain the methods of grading of cables. (13)

Or

- (b) Classify the types of cable and derive the expression for the capacitance of a single core cable. (13)

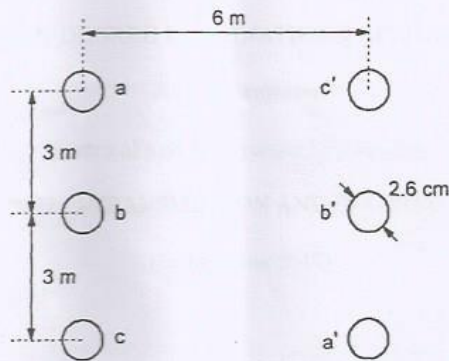
15. (a) With neat diagram, discuss the various methods of neutral grounding of a three-phase system. (13)

Or

- (b) Explain the functions of various equipment of a transformer sub-station. (13)

PART C — (1 × 15 = 15 marks)

16. (a) The spacing of a double circuit 3-phase overhead line is represented in the figure shown below. The phase sequence is ABC and the line is completely transposed. The conductor radius is 1.3 cm. Find the inductance per phase per kilometer.



Or

- (b) Draw and explain the structure of modern power system with typical voltage levels.