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Question Paper Code : 80374

B.E./B.Tech. DEGREE EXAMINATION, NOVEMBER/DECEMBER 2016.

Fourth Semester

Electrical and Electronics Engineering

EE 6402 — TRANSMISSION AND DISTRIBUTION

(Regulations 2013)

Time : Three hours   Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. Define feeder and distributor.

2. State the applications of HVDC transmission.

3. What are the advantages of using bundled conductors?

4. What is skin effect?

5. State the condition for maximum power delivered and draw the power angle diagram.

6. Mention the various methods of voltage control in transmission lines.

7. What are the methods of improving string efficiency in line insulators?

8. Mention any four insulating materials used for underground cables.

9. What are the factors affecting sag in a transmission line?

10. What is the need for earthing?

PART B — (5 × 16 = 80 marks)

11. (a) (i) Explain the effect of high voltage on volume of copper and on efficiency. (8)

    (ii) Derive suitable expressions to determine the voltage drop and power loss in an uniformly loaded distributor of length '1' fed at both ends with equal voltages. (8)

Or

    (b) (i) Make a comparison between EHVAC and HVDC system based on economics. (8)

    (ii) Explain the different HVDC links. (8)

12. (a) (i) Derive the expression for inductance of a three phase transmission line with unsymmetrical spacing. (8)

    (ii) A 220 kV, 50 Hz, 200 km long transposed three phase line has its conductors on the corners of a triangle with sides 6 m, 6 m and 10 m. The conductor radius is 1.81 cm. Find the capacitance per phase per km of the line. (8)

Or

    (b) Explain the formation of corona, critical voltages, corona loss, advantages, disadvantages and methods to reduce the effect of corona. (16)

13. (a) A 50 Hz, 3φ transmission 30 km long has a total series impedance of $(40 + j125)\,\Omega$ and shunt admittance of 10^{-3} mho. The load is 50 MW at 220 kV with 0.8 pf lag. Find the sending end voltage, current, power factor, efficiency and regulation using nominal π-method. (16)

Or

    (b) Derive the expression for the real and reactive power flow through transmission lines. (16)

14. (a) (i) Explain different types of insulators. (8)

    (ii) A string of five insulator units has mutual capacitance equal to 10 times the pin to earth capacitance, find voltage distribution across various units as the per cent of the total voltage across the string and string efficiency. (8)

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(b) A 2 km long 3 core, 3Φ cable has capacitance 0.5 μ F/km between two conductors bunched with sheath and the third conductor. The capacitance between the conductors is also measured when bunched together and the sheath and found to be 0.75 μ F/km. Determine

   (i)   Capacitance between phases

   (ii) Capacitance between the conductor and the sheath

   (iii) Effective per phase capacitance

   (iv) Capacitance between two conductors connecting a third conductor to the sheath

   (v)   Charging current if the supply voltage is 11 kV, 50 Hz.   (16)

15. (a) An OHL at a river crossing is supported from two towers of heights 30 m and 90 m above water level with the span of 300 m. The weight of the conductor is 1 kg/m and working tension is 2000 kg. Determine the clearance between the conductor and the water level midway between the towers.   (16)

Or

(b) Explain the methods of neutral grounding.   (16)

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