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Question Paper Code : 52953

B.E./B.Tech. DEGREE EXAMINATION, APRIL/MAY 2019.

Fourth Semester

Electrical and Electronics Engineering

EE 6402 — TRANSMISSION AND DISTRIBUTION

(Regulations 2013)

(Common to PTEE 6402 — Transmission and Distribution for B.E. (Part-Time) for Fourth Semester — Electrical and Electronics Engineering — Regulations 2014)

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. Define transposition of lines.

4. What is corona?

5. What is Ferranti effect?

6. Write down the significance of SIL on transmission line.

7. What is the purpose of insulator?

8. What is the main purpose of armouring in cables?

9. What is meant by tower spotting?

10. What is meant by sag template?

PART B — (5 × 13 = 65 marks)

11. (a) Explain the structure of electric power system in detail.

Or

(b) (i) Compare the overhead and underground distribution system. (8)

(ii) State the advantages of Interconnected system. (5)

12. (a) Derive an expression for loop inductance of a single phase transmission system.

Or

(b) Derive from first principles the capacitance per km to neutral of a three phase overhead transmission line with unsymmetrical spacing of conductors assuming transposition.

13. (a) A 3ϕ, 50 Hz, 100 km line has the following constants. Resistance/phase/km = 0.153 ohm, inductance/phase/km = 1.21 mH, capacitance/phase/km = 0.00958 μF. If the line supplies a load of 20 MW at 0.9 pf lagging at 110 kV at the receiving end, calculate sending end current, sending end power factor, regulation and transmission efficiency using nominal T method.

Or

(b) The constants of a three phase line are $A = 0.9\angle 2^\circ$ and $B = 140\angle 70^\circ$ ohms per phase. The line delivers 60 MVA at 132 kV and 0.8 pf lagging. Draw power circle diagram and find (i) sending end voltage and power angle (ii) the maximum power which the line can deliver with the above values of sending and receiving end voltages (iii) the sending end power and power factor (iv) line losses.

14. (a) (i) Explain different types of insulators. (5)

(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)

Or

(b) A 2 km long 3 core, 3ϕ cable has capacitance 0.5 μF/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 μF/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.

15. (a) Write short notes on :

(i) Sub mains (4)

(ii) Stepped and tapered mains (5)

(iii) Grounding grids. (4)

Or

(b) Explain the following :

(i) Neutral grounding (7)

(ii) Resistance grounding. (6)

PART C — (1 × 15 = 15 marks)

16. (a) A 400 V, 3 phase 4 wire service mains supplies a star connected load. The resistance of each line is 0.1 ohm and that of the neutral 0.2 ohm. The load impedances are $Z_R = (6 + j9)$, $Z_y = 8$ ohms and $Z_B = (6 - j8)$. Calculate the voltage across each load impedance and current in the neutral. Phase sequence RYB.

Or

(b) Explain your understanding about transmission of power and distribution of power.