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D 4170

B.E./B.Tech. DEGREE EXAMINATION, NOVEMBER/DECEMBER 2008.

Fourth Semester

(Regulation 2004)

Electrical and Electronics Engineering

EE 1252 — TRANSMISSION AND DISTRIBUTION

(Common to B.E. (Part-Time) Third Semester Regulation 2005)

Time : Three hours

Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. Name some HVDC systems in India.
2. Give various types of FACTS devices.
3. List out the advantages of bundled conductors.
4. What is Skin effect?
5. What is Surge Impedance Loading?
6. What is Power circle diagram?
7. What are the various methods of improving string efficiency?
8. Give the classifications of cable for single and three phase service with operating voltages.
9. Name the factors that should be taken care of while designing and erecting a sub-station.
10. Give the different types of bus-bar arrangements used in sub-stations.

11. (a) (i) Give the advantages of HVDC transmission over HVAC transmission system. (6)
- (ii) Explain why the transmission of electric power is carried at high voltage. Give the reasons. (10)

Or

- (b) A 50 km long transmission line supplies a load of 5 MVA at 0.8 p.f. lagging at 33 KV. The efficiency of transmission is 90%. Calculate the volume of aluminium conductor required for the line when (i) single phase, 2-wire system is used (ii) 3-phase, 3 wire system is used. The specific resistance of aluminium is $2.85 \times 10^{-8} \Omega \text{ m}$.
12. (a) (i) Write short note on Proximity effect. (6)
- (ii) A 400 KV, 3-phase bundled conductor line with two sub-conductors per phase has a horizontal configuration as shown in Fig. 13 (a) (ii). The radius of each sub-conductors is 1.6 cm. (1) Find the inductance per phase per km of the line (2) Compute the inductance of the line with only one conductor per phase having the same cross-sectional area of the conductor of each-phase. (10)

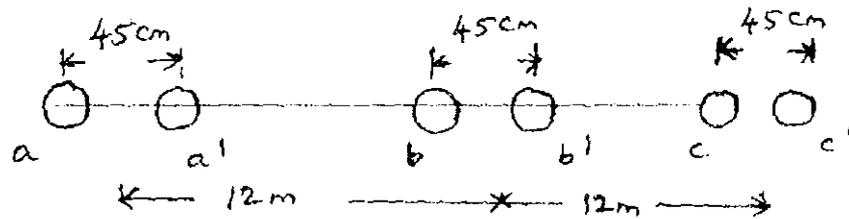


Fig. 13 (a) (ii)

Or

- (b) (i) Derive an expression for the capacitance of a single phase overhead transmission line. (8)
- (ii) 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. (8)

13. (a) A 3-phase, 50 Hz, 100 Km long overhead line has the following line constants : resistance per phase per Km = 0.153 ohm, inductance per phase per Km = 1.21 mH, capacitance per phase per Km = 0.00958 μ F. The line supplies a load of 20 MW at 0.9 power factor lagging at a line voltage of 110 KV at the receiving end. Use nominal π representation, calculate sending end voltage, sending end current, sending end power factor, regulation and efficiency.

Or

- (b) (i) What is Ferranti effect? Explain them with phasor diagram. (8)
- (ii) What are the various factors affecting corona loss? Explain them. (8)
14. (a) An insulator string for 66 kV line has 4 discs. The shunt capacitance between each joint and metal work is 10% of the capacitance of each disc. Find the voltage across the different discs and string efficiency.

Or

- (b) With neat diagram explain the various methods of grading of cables.
15. (a) With neat layout and schematic connection explain the pole mounted sub-station.

Or

- (b) Explain with neat diagram any two bus-bar arrangements used in sub-station.