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Question Paper Code : 51442

B.E./B.Tech. DEGREE EXAMINATION, MAY/JUNE 2014.

Fifth Semester

Electrical and Electronics Engineering

EE 2303/EE 53/10133 EE 506 — TRANSMISSION AND DISTRIBUTION

(Regulation 2008/2010)

(Common to PTEE 2303 – Transmission and Distribution for B.E. (Part-Time) Third Semester – Electrical and Electronics Engineering – Regulations 2009)

Time : Three hours Maximum : 100 marks

Answer ALL questions.

PART A — ($10 \times 2 = 20$ marks)

1. What are the components of a power system?

2. What is a sag template?

3. What is skin effect?

4. Define proximity effect?

5. Define voltage regulation of a transmission line.

6. What is the difference between nominal T and nominal π methods?

7. What is a shackle insulator?

8. What is meant by dielectric stress in a cable?

9. What are the major equipments of a substation?

10. Enumerate the various methods of neutral grounding.

PART B — (5 × 16 = 80 marks)

11. (a) Describe the basic structure of an ac power system with a single line diagram. (16)

Or

(b) An overhead line has a span of 160m of stranded copper conductor between level supports. The sag is 3.96 m at –5.5° C with 9.53 mm thick in ice coating and wind pressure of 40 Kgf/m^2 of projected area. Calculate the temperature at which the sag will remain the same under conditions of no ice and no wind. The particulars of the conductor are as follows: Size of conductor = 7/3.45 mm, Area of cross section = 64.5 mm^2 weight of conductor = 0.594 Kgf/m, Modulus of elasticity = 12700 Kgf/mm^2, Coefficient of linear expansion $= 1.7 \times 10^{-5}$ /° C, Assume 1 m^3 of ice to weight 913.5 Kgf. (16)

12. (a) Derive the capacitance of a three-phase overhead line. (16)

Or

(b) Estimate the corona loss for a three-phase, 110 Kv, 50 Hz, 150 Km long transmission line consisting of three conductors each of 10 mm diameter and spaced 2.5m apart in a equilateral triangle formation. The temperature of air is 30° C and the atmospheric pressure is 750 mm of mercury. Assume the irregularity factor as 0.85. Ionization of air may be assumed to take place at a maximum voltage gradient of 30Kv/cm. (16)

13. (a) Explain the method of drawing receiving end power circle diagrams. (16)

Or

(b) A 50 Hz, three-phase transmission line is 250 Km long. It has a total series impedance of (40+j100) ohms and a shunt admittance of 914×10^{-6} ohms. It delivers 50 Mw at 220 Kv with a power factor of 0.9 lag. Find the :

(i) Sending end voltage

(ii) Voltage regulation

(iii) Transmission efficiency by nominal –T method. (16)

14. (a) Draw with neat sketches and explanation of pin and suspension type insulators. Compare their merits and demerits. (16)

Or

(b) Discuss the capacitance grading of underground cables. (16)

15. (a) Explain in detail the various types of bus bar arrangements. (16)

Or

(b) (i) Explain the various types of d.c. distributors. (8)

(ii) An electric train taking a constant current of 600 A moves on a section of line between two substations 8 km and maintained at 575 and 590 volts respectively. The track resistance is 0.04 ohm per km both go and return. Find the point of minimum potential along the track and currents supplied by two substations at that instant. (8)

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