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10EE53

Fifth Semester B.E. Degree Examination, Dec.2014/Jan.2015
Transmission and Distribution

Time: 3 hrs. Max. Marks:100

Note: ***1. Answer any FIVE full questions, selecting atleast TWO questions from each part.***
2. Any missing data may be suitably assumed.

PART – A

1 a. With a neat sketch, describe a typical transmission and distribution scheme. **(07 Marks)**

b. Discuss the advantages and disadvantages of high voltage transmission. **(07 Marks)**

c. Draw a schematic diagram and hence briefly describe feeders, distributors and service mains. **(06 Marks)**

2 a. A transmission line conductor at a river crossing is supported from two towers at heights of 50m and 80m above water level. The horizontal distance between the towers in 300m. If the tension in the conductor is 2,000kg. Find the clearance between the conductor and water at a point midway between the towers, weight of conductor = 0.844 kg/m. Assume that the conductor takes the shape of a parabola. **(07 Marks)**

b. Derive the relevant equations for demonstrating the effect of ice deposition and wind loading on sagging of a transmission line. **(08 Marks)**

c. Write a short note on stringing charts. **(05 Marks)**

3 a. Describe pin type insulator with a neat sketch. **(06 Marks)**

b. A three-phase overhead transmission line is supported by 3 suspension type insulators. The potential across first and second insulators are 8kV and 11kV respectively. Calculate:
i) Ratio of self to shunt capacitance; ii) Line voltage; iii) String efficiency. **(06 Marks)**

c. Write a short note on testing of insulators briefly explaining different tests. **(08 Marks)**

4 a. Discuss different factors affecting corona power loss. **(07 Marks)**

b. Derive the expression for capacitance of a single core cable. **(05 Marks)**

c. A 66kV, 3 phase system uses single core cables of conductor diameter 2cm and outer lead sheath diameter 5.3cm. Two intersheaths of diameters 3.1cm and 4.2cm are introduced between the core and outer lead sheath. If the insulating material used throughout is the same and if maximum stress in the layers is also same, find the voltages on the intersheaths. **(08 Marks)**

PART – B

5 a. Derive the expression for inductance of a 3-phase symmetrically spaced transmission line. **(07 Marks)**

b. Explain the process of transposition of transmission lines and its advantages. **(05 Marks)**

c. Obtain self GMD and mutual GMD and hence calculate inductance/km of each conductor in a 3 phase-3 wire system. Conductors are arranged at the vertices of a triangle of sides 2.5m, 3m and 5m. These are transposed at regular intervals. Diameter of each conductor is 1.5cm. **(08 Marks)**

6 a. Describe composite conductors and discuss their advantages. **(05 Marks)**

b. Derive the expression for capacitance of a transposed 3-phase line with unsymmetrical spacing. **(08 Marks)**

c. A single phase overhead line 30km long consists of 2 parallel wires each 5mm in diameter and 1.5m apart. If the line voltage is 50kV at 50Hz, calculate charging current with line open-circuited. **(07 Marks)**

7 a. Discuss the nominal T model of a medium transmission line with appropriate circuit diagram and phasor diagram and hence obtain the expressions for regulation and ABCD constants for the same. **(10 Marks)**

b. A 3-phase short transmission line delivers 3MW at a p.f. of 0.8 lagging to a load. If the sending end voltage is 33kV, determine: i) Receiving end voltage; ii) Line current; iii) Transmission efficiency; iv) Regulation. The resistance and reactance of each conductor are 5Ω and 8Ω respectively. **(10 Marks)**

8 a. Briefly explain radial and ring main distributors. **(06 Marks)**

b. Write the schematic diagram and hence get the expressions for voltages at different tapping points of a DC distributor fed at one end with concentrated loads. **(06 Marks)**

c. A two conductor copper cable is loaded as shown in Fig.Q.8(c). Both the ends are fed at the same voltage of 250V DC. Calculate: i) The point of minimum potential; ii) The current in each section; iii) The voltages at load points. The resistance of copper is 0.8Ω per km for go and return wires put together. **(08 Marks)**

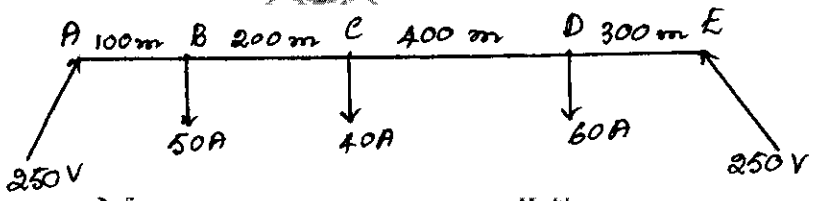

Fig.Q.8(c)

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