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10EE53

Fifth Semester B.E. Degree Examination, Dec.2018/Jan.2019
Transmission and Distribution

Time: 3 hrs. Max. Marks:100

Note: ***Answer any FIVE full questions, selecting atleast TWO questions from each part.***

PART – A

1 a. Draw the single line diagram of typical power supply scheme indicating the standard voltages. **(05 Marks)**

b. State the effect of high voltage used in transmission on :
i) Volume of copper required ii) Line efficiency iii) Line voltage drop. **(10 Marks)**

c. Write the comparison between overhead and under ground transmission system. **(05 Marks)**

2 a. Derive the expression for sag in overhead line conductors supported by the towers situated at different levels. **(06 Marks)**

b. Write a note on : i) Stringing chart ii) Sag Template. **(06 Marks)**

c. A transmission line has a span of 200 meters between level supports. The conductor has a cross sectional area of 1.29cm^2, weights 1170 kg/km and has a breaking stress of 4218 kg/cm^2. Calculate the sag for a safety factor of 5, allowing a wind pressure of 122 kg per square metre of projected area. What is the vertical sag? **(08 Marks)**

3 a. State the various properties of an insulator. **(05 Marks)**

b. An insulator string consists of three units, each having a safe working voltage of 15 KV. The ratio of self – capacitance to shunt capacitance of each unit is 8:1. Find the maximum safe working voltage of the string. Also find the string efficiency. **(10 Marks)**

c. Write a note on testing of insulators. **(05 Marks)**

4 a. Discuss the different factors affecting Corona. **(06 Marks)**

b. Derive the expression for capacitance of a Single Core Cable. **(06 Marks)**

c. A 66KV single core lead sheathed cable is graded by using two dielectrics of relative permittivity 5 and 3 respectively. Thickness of each being 1cm. The core diameter is 2cm. Determine the maximum stress in the two dielectrics. **(08 Marks)**

PART – B

5 a. Derive an expression for the inductance per phase for a 3 phase over head transmission line when conductors are unsymmetrically placed but the line is completely transposed. **(10 Marks)**

b. Find the inductance per phase per km of double circuit 3 phase line shown in fig. Q5(b). The conductors are transposed and are of radius 0.75cm each. The phase sequence is ABC. **(10 Marks)**

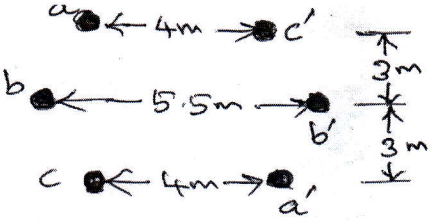

Fig.Q5(b)

6 a. Derive the expression for capacitance of a Single phase transmission line. **(07 Marks)**
b. Write a short notes on Bundled conductors. **(05 Marks)**
c. A 3 – phase, 50 Hz, 132 KV, overhead line has conductors placed in a horizontal plane 4m apart. Conductor diameter is 2cm. If the length is 100 km, calculate the charging current per phase assuming complete transposition. **(08 Marks)**

7 a. Deduce an expression for transmission efficiency and regulation for medium transmission line using nominal 'T' method. **(06 Marks)**
b. A 3- phase, 50 Hz, 150 km line has a resistance , inductive reactance and capacitive shunt admittance of 0.1Ω , 0.5 Ω and 3×10^{-6} S per km per phase. If the line delivers 50 MW and 110 KV and 0.8 p.f lagging, determine the sending end voltage and current. Assume a nominal 'π' circuit for the line. **(10 Marks)**
c. Write short note on 'Ferranti effect'. **(04 Marks)**

8 a. Bring out the difference between :
i) Feeders , distributions and service mains.
ii) Radial system and ring main systems. **(06 Marks)**
b. Explain the various types D.C. distributions. **(07 Marks)**
c. What are the methods used to solving A.C. distribution problems? Explain any one method in detail. **(07 Marks)**

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