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10EE53

Fifth Semester B.E. Degree Examination, June/July 2015
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. Explain with the help of a neat line diagram a typical transmission and distribution system scheme indicating the standard voltages. **(05 Marks)**

b. What are the advantages of High voltage transmission? Explain. **(05 Marks)**

c. Write a short note on : i) HVDC transmission ii) Feeders iii) Distribution & Service mains along with a neat sketch. **(10 Marks)**

2 a. Explain Sag. What are the factors affecting Sag? Derive the expression for the sag when the supports are at unequal heights. **(10 Marks)**

b. A transmission line conductor at a river crossing is supported from two towers of heights 50 mts & 80mts above water level. The horizontal distance between the towers is 500 mts. If the tension in the conductor is 3000 kgs. Find the minimum clearance between the conductor and water. Weight of the conductor per meter is 0.844 kg. **(06 Marks)**

c. Write a short note on Vibrations of Conductors. **(04 Marks)**

3 a. Define String Efficiency. Derive an expression for the string efficiency of 4 disc string. **(08 Marks)**

b. Explain the methods of improving the string efficiency. **(06 Marks)**

c. In a 33kV overhead line, there are three units in the string of insulators. If capacitance between each insulator pin and earth is 11% of self capacitance of each insulator, find i) The distribution of voltage over 3 insulators and ii) String efficiency. **(06 Marks)**

4 a. Explain i) Corona ii) Critical disruptive voltage iii) Method of Reducing corona effect. **(06 Marks)**

b. Compare underground cable system with overhead system. Mention atleast eight comparisons. **(04 Marks)**

c. A single core cable is used on a 66KV, 3 phase system. The core diameter is 1cm while the insulation thickness is 1.5cm. if PVC of relative permittivity 4.8 is used as dielectric, calculate the capacitance of cable and its charging current. The supply frequency is 50Hz. Assume cable length to be 1.5km. **(06 Marks)**

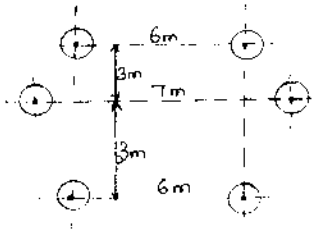
d. Briefly explain i) Murray Loop test ii) Laying of underground cable. **(04 Marks)**

PART - B

5 a. What is Transposition of transmission line? Calculate the inductance of 3 phase line with unsymmetrical spacing but transposed. **(10 Marks)**

b. Find the inductance / Ph / km of Double circuit 3 phase line shown in fig. Q5(b). The line is completely transposed. Use GMD method. The radius of the conductor is 9mm. **(10 Marks)**

Fig.Q5(b)

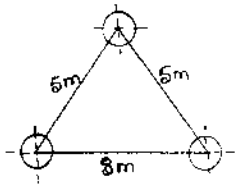


6 a. Explain the terms self QMD and Mutual QMD. **(06 Marks)**

b. Derive an expression for the capacitance of a single phase overhead transmission line. **(06 Marks)**

c. A single circuit three phase 50Hz transmission line consists of three conductors, arranged as shown in fig. Q6(c). If the conductors have diameter equal to 0.8cm, find the inductive reactance of 25km long line / km / phase. Also, calculate the capacitance and capacitive reactance of the transmission line. **(08 Marks)**

Fig.Q6(c)



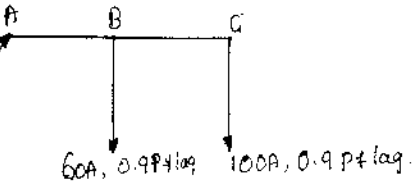
7 a. Write a short note on Ferranti effect. **(05 Marks)**

b. Derive an expression for ABCD constants of a long transmission lines using Rigorous method of analysis. **(10 Marks)**

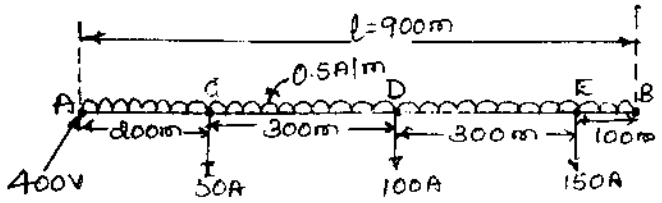
c. A 3 phase line delivers 5000 kW at 22kv and at a p.f of 0.8 lagging to a load. Determine i) Sending end voltage ii) % Regulation iii) Transmission efficiency. The resistance and reactance of each conductor is 4Ω and 6Ω respectively. **(05 Marks)**

8 a. A two wire distributor 1200m long is loaded as shown in fig. Q8(a), B is the mid point. The power factors at the two load points refer to the voltage at C. The impedance of each line is (0.15 + j 0.2)ohm. Calculate the sending end voltage current and power factor. The voltage at point C is 220V. **(10 Marks)**

Fig.Q8(a)



b. A 2 wire d.c. distributor AB, 900m long is fed at A at 400V and loads of 50A, 100A, 150A are tapped off from C, D and E which are at a distance of 200m, 500m and 800m from point 'A' respectively. The distributor is also loaded uniformly at the rate of 0.5A/m. If the resistance of distributor per meter is 0.00001Ω, calculate the voltage at i) point B and ii) at point D. **(10 Marks)**



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