10EE53

Fifth Semester B.E. Degree Examination, June/July 2018
Transmission & Distribution

Time: 3 hrs.   Max. Marks: 100

Note: *Answer FIVE full questions, selecting*
at least TWO questions from each part.

PART – A

1   a. Draw and explain the line diagram of a typical power supply scheme indicating the standard voltages. **(10 Marks)**

b. Why it is necessary to use high voltage for power transmission? **(05 Marks)**

c. What are the effects of Sag and tension on the conductor of a transmission line? **(05 Marks)**

2   a. Obtain the expression for sag in a freely suspended conductor when the supports are at different levels considering ice and wind affects. **(10 Marks)**

b. The towers of height 30 m and 90 m respectively support a transmission line conductor at water crossing. The horizontal distance between the towers is 500 m. If the tension in the conductor is 1600 kg, find the maximum clearance of the conductor and water and also clearance midway between the supports, weight of the conductor is 1.5 kg/m. Bases of the towers can be considered to be at water level. **(10 Marks)**

3   a. Define string efficiency. How the string efficiency of an insulator is improved by using different methods? **(10 Marks)**

b. A string of 4 insulators has a self capacitance equal to 10 times pin to earth capacitance. Find the voltage distribution across various units as a percentage of total voltage across the string. **(10 Marks)**

4   a. Explain capacitance grading of cables with appropriate derivation. **(10 Marks)**

b. A single core cable has a conductor diameter of 2.5 cm and a sheath of inside diameter 6 cm. Calculate the maximum stress. It is desired to reduce the maximum stress by using two intersheath. Determine maximum stress by using two intersheath. **(05 Marks)**

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

PART – B

5   a. Show that the inductance of a double circuit 3 phase line can be calculated by method of GMD and GMR. Assume complete transposition. **(08 Marks)**

b. The 3 conductors of a 3 phase line are arranged at the corners of a triangle of size 2 m, 2.5 m, and 4.5 m. Calculate the inductance per km of the line when conductors are regularly transposed. The diameter of each conductor is 1.24 cm. **(07 Marks)**

c. Explain the terms self GMD and mutual GMD. **(05 Marks)**

6   a. Explain with reasons the presence of ground on the capacitance can be taken into account by the method of images. Hence find the earth effect on the capacitance of single phase line. **(10 Marks)**

b. Derive the expression for capacitance of a 3 phase line with unsymmetrical spacing. **(10 Marks)**

7   a. Two transmission line having generalized circuit constants $A_1 B_1 C_1 D_1$ and $A_2 B_2 C_2 D_2$ are connected in (i) series (ii) parallel. Develop expression for overall constants ABCD in terms of $A_1 B_1 C_1 D_1$ and $A_2 B_2 C_2 D_2$. **(10 Marks)**

b. Derive an expression for ABCD constants of a medium transmission line using nominal π-method. Show that AD – BC = 1. **(10 Marks)**

8   a. What are the requirements of a good distribution system? **(05 Marks)**

b. Compare radial and ring main distribution system. **(05 Marks)**

c. Explain how a 2-wire DC distribution with concentrated load fed at one end can be represented by a single line diagram. **(10 Marks)**

* * * * *