

CBCS SCHEME

17EE43

Fourth Semester B.E. Degree Examination, July/August 2021 Transmission and Distribution

Time: 3 hrs.

Max. Marks: 100

Note: Answer any FIVE full questions.

1. a. Draw and explain one line diagram of power system. Mention the voltage levels. (08 Marks)
b. Compare HVAC and HVDC transmission line. (06 Marks)
c. Explain the importance of sag. Derive an expression for sag of transmission line when two supporting structures are at equal level. (06 Marks)
2. a. Write a note on effect of ice loading and wind effect. (06 Marks)
b. Briefly explain the types of insulators used in transmission line. (06 Marks)
c. Two towers of height 40m and 30m respectively, support a transmission line conductor at water crossing. The horizontal distance between the towers is 300m. If the tension in the conductor is 1500kg, find the clearance of the conductor at a point midway between the supports. Weight of the conductor is 0.8kg/m. Assume bases of the towers to be at the water level. (08 Marks)
3. a. Derive an expression for inductance of 3-phase double line symmetrically spaced transmission line. (08 Marks)
b. Explain the transmission line parameters with related equations. (06 Marks)
c. A 3-phase transmission line has a conductor diameter of 1.8cm each, the conductor being spaced as shown in Fig.Q.3(c). The loads are balanced and the line is transposed. Find the inductance per phase of 50km long transmission line. (06 Marks)

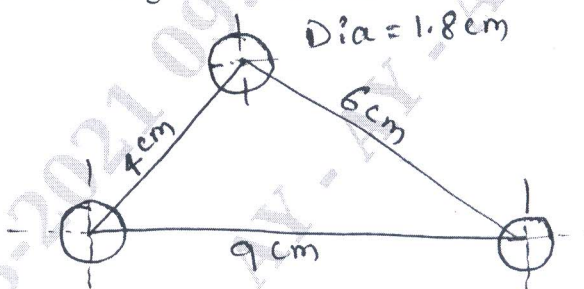


Fig.Q.3(c)

4. a. Mention the merits of single circuit and double circuit transmission line. (06 Marks)
b. Obtain an expression for capacitance of single phase transmission line. (06 Marks)
c. A 3-phase, 66KV, overhead transmission line operated at a frequency of 50Hz. The conductor diameter is 1.25cm and are placed in a horizontal plane at equal distance of 2m. If length of line is 100km calculate the capacitance of charging current/phase. Assuming complete transposition of the lines. (08 Marks)

- 5 a. Deduce an expression for sending end voltage and current of a medium transmission line nominal T-method in terms of Y , Z , V_R and I_R . (10 Marks)
- b. A 3-phase, 50Hz overhead transmission line has the following constants per phase $R = 28\Omega$, $X = 63\Omega$, $Y = 4 \times 10^{-4}(\text{U})$. If the load at the receiving end is 75MVA at 0.8pf lag with 132KV between lines. Calculate the voltage, current and power factor at the sending end. Use minimal π method. (10 Marks)
- 6 a. Derive an expression for ABCD constants of a medium transmission lines using nominal T method show that $AD-BC = 1$. (10 Marks)
- b. Explain the Ferranti effect in detail. (10 Marks)
- 7 a. What is Corona? Deduce the expressions for disruptive critical voltage and visual critical voltage. (08 Marks)
- b. Write a note on factors affecting the Corona and methods to reduce it. (08 Marks)
- c. Mention the requirements of underground cables. (04 Marks)
- 8 a. What is grading of cables? Briefly explain the capacitance grading. (08 Marks)
- b. List and explain the classification of underground cable. (06 Marks)
- c. Which are the important insulating materials used for the cables? (06 Marks)
- 9 a. What is distribution system? Explain feeders, distributors and service mains. (08 Marks)
- b. Explain different methods to obtain 3-wire DC system. (06 Marks)
- c. Explain and compare the radial and ring main distribution system. (06 Marks)
- 10 a. What is reliability? Explain the concept of failure probability. (08 Marks)
- b. What is power quality? What are different power quality problem? (06 Marks)
- c. What are the limitations of distribution system? (06 Marks)
