

CBCS SCHEME



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17EE43

Fourth Semester B.E. Degree Examination, Dec.2019/Jan.2020 Transmission and Distribution

Time: 3 hrs.

Max. Marks: 100

Note: Answer any FIVE full questions, choosing ONE full question from each module.

Module-1

- Explain the advantages of high voltage transmission with suitable expressions. (08 Marks)
 - A transmission line has a span of 150 m between level supports. The conductor has a cross sectional area of 2 cm^2 . The tension in the conductor is 2000 kg. If the specific gravity of the conductor materials is 9.9 gm/cm^3 and wind pressure is 1.5 kg/m length, calculate the sag. What is the vertical sag? (12 Marks)

OR

- Define: (i) ACSR (ii) GTACSR (iii) String efficiency (iv) Vibration damper (08 Marks)
 - Each line of a 3-phase system is suspended by a string of 3 similar insulators. If the voltage across the line unit is 17.5 KV, calculate the line to neutral voltage. Assume that the shunt capacitance between each insulator and earth is $1/8^{\text{th}}$ of the capacitance of the insulator itself. Also find the string efficiency. (12 Marks)

Module-2

- Derive an expression for the inductance of a conductor due to internal and external flux. (12 Marks)
 - The three conductors of a 3 phase line are arranged at the corners of a triangle of side 2m, 2.5 m and 4.5 m, Calculate the inductance per km of the line when the conductors are regularly transposed. The diameter of each conductor is 1.24 cm. [Refer Fig.Q3(b)]

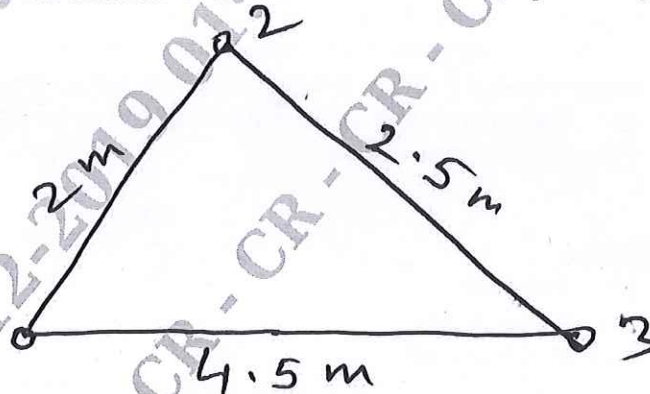


Fig.Q3(b)

(08 Marks)

OR

- Derive the expression for line to neutral capacitance for a 3 phase overhead line when the conductors are symmetrically spaced. (12 Marks)
 - A single phase transmission line has two parallel conductors 3 metre apart, radius of each conductor being 1 cm. Calculate the capacitance of the line per km. Given that $\epsilon_0 = 8.854 \times 10^{-12} \text{ F/m}$. (08 Marks)

Module-3

- 5 a. Explain the nominal π method for obtaining the performance calculation of medium transmission line. Draw the corresponding vector diagram. (10 Marks)
- b. A short 3ϕ transmission line with an impedance of $(6 + j8) \Omega$ per phase has sending and receiving end voltages of 120 KV and 110 KV respectively for some receiving end load at a p.f. of 0.9 lagging. Determine:
- (i) Power output
- (ii) Sending end power factor. (10 Marks)

OR

- 6 a. Develop the generalized circuit constants for:
- (i) Short transmission line (10 Marks)
- (ii) Medium line using nominal T method. (06 Marks)
- b. Differentiate different types of overhead transmission line. (04 Marks)
- c. Write a short note on Ferranti effect.

Module-4

- 7 a. Define corona. What are the factors which affect corona? (06 Marks)
- b. Explain with reference to corona:
- (i) Critical descriptive voltage (08 Marks)
- (ii) Visual critical voltage (06 Marks)
- c. Explain methods of reducing corona effect in an overhead transmission line.

OR

- 8 a. Define grading of cables. Explain inter sheath grading of cable. (08 Marks)
- b. Derive an expression for the insulation resistance of a single core cable. (08 Marks)
- c. Write the comparison between ac and dc cable. (04 Marks)

Module-5

- 9 a. Explain Radial and Ring main distributor. (08 Marks)
- b. A 2 wire dc distributor 200 metres long is uniformly loaded with 2 A/metre. Resistance of single wire is $0.3 \Omega/\text{km}$. If the distributor is fed at one end. Calculate:
- (i) The voltage drop upto a distance of 150 m from feeding point
- (ii) The maximum voltage drop. (12 Marks)

OR

- 10 a. Define:
- (i) Reliability (08 Marks)
- (ii) Power quality (08 Marks)
- (iii) Reliability aids (04 Marks)
- b. Explain the requirements of good distribution system. (08 Marks)
- c. Explain the effect of disconnection of neutral in a 3 phase 4 wire systems. (04 Marks)

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