CBCS SCHEME

USN | | | | | | | | | | |

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

1 a. Explain the advantages of high voltage transmission with suitable expressions. **(08 Marks)**

b. 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

2 a. Define: (i) ACSR (ii) GTACSR (iii) String efficiency (iv) Vibration damper **(08 Marks)**

b. 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 $1/8^{th}$ of the capacitance of the insulator itself. Also find the string efficiency. **(12 Marks)**

Module-2

3 a. Derive an expression for the inductance of a conductor due to internal and external flux. **(12 Marks)**

b. 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)]

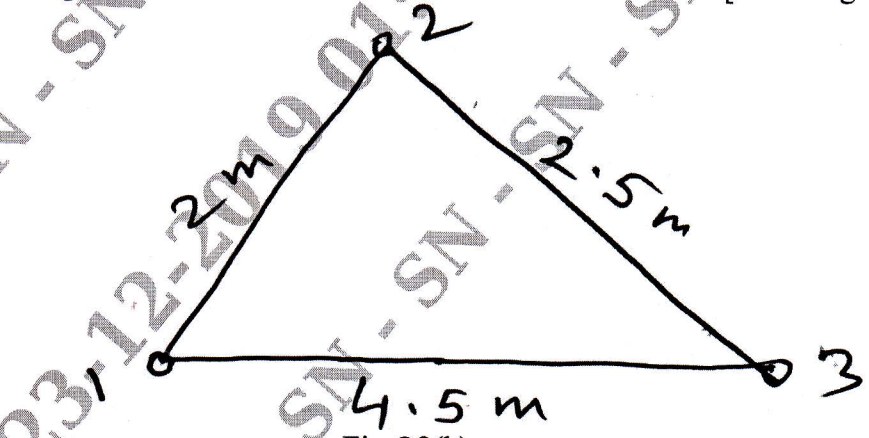

Fig.Q3(b) **(08 Marks)**

OR

4 a. Derive the expression for line to neutral capacitance for a 3 phase overhead line when the conductors are symmetrically spaced. **(12 Marks)**

b. 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 $\epsilon_0 = 8.854 \times 10^{-12}$ 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) Ω 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
(ii) Medium line using nominal T method. **(10 Marks)**

b. Differentiate different types of overhead transmission line. **(06 Marks)**

c. Write a short note on Ferranti effect. **(04 Marks)**

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
(ii) Visual critical voltage **(08 Marks)**

c. Explain methods of reducing corona effect in an overhead transmission line. **(06 Marks)**

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 Ω/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
(ii) Power quality
(iii) Reliability aids **(08 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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