CBCS SCHEME

Fourth Semester B.E. Degree Examination, Feb./Mar. 2022
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.   With the help of single line diagram, explain power system scheme and indicate standard voltage. **(08 Marks)**

    b.   Show that increase in transmission voltage of a transmission line results in
        i)   Increased efficiency
        ii)   Recued weight of conductor
        iii)   Reduced line drop. **(12 Marks)**

OR

2   a.   Define sag and explain its importance also derive an expression for sag of a transmission line when supports are at the same level. **(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 17.5kV, 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.   Obtain an expression for inductance of three – phase transmission line with transposed unsymmetrical spacing between conductors. **(12 Marks)**

    b.   Explain the term self GMD and mutual GMD. **(08 Marks)**

OR

4   a.   Fig Q4(a) shows the spacing a double circuit 3-phase overhead line. The phase sequence is ABC and the line is completely transposed. The conductor radius is 1.3cm. Find the inductance per phase per kilometer.
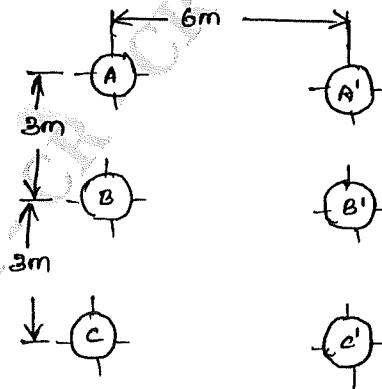

Fig Q4(a)   **(12 Marks)**

    b.   Derive an expression for capacitance per phase of three phase double circuit with unsymmetrical spacing transposed. **(08 Marks)**

Module-3

5 a. Write a short notes on classification of transmission lines. Also explain voltage regulation and transmission efficiency with suitable formula. **(08 Marks)**

   b. Explain the nominal T method for obtaining the performance calculation of medium transmission line. Draw the corresponding vector diagram. **(12 Marks)**

OR

6 a. Develop the ABCD circuit constants for
   i)   Short transmission line
   ii) Medium line using nominal π method. **(10 Marks)**

   b. A 3-phase line delivers 3600kW at a p.f 0.8 lagging to a load. If the sending end voltage is 33kV, determine :
   i)   Receiving end voltage
   ii) Line current
   iii) Transmission efficiency.
   The resistance is 5.31Ω and reactance is 5.54Ω for each conductor. **(10 Marks)**

Module-4

7 a. What is Corona? State and explain with the expression for disruptive critical voltage and visual critical voltage? **(10 Marks)**

   b. Derive an expression for the insulation resistance of a single core cable. **(10 Marks)**

OR

8 a. Draw the cross sectional view of a single core cable and explain its constructor. **(10 Marks)**

   b. A 33kV, 50Hz, 3-phase underground cable, 4km long uses three single core cables. Each of the conductors has a diameter of 2.5cm and the radial thickness of insulation is 0.5cm. Determine :
   i)   Capacitance of the cable/phase
   ii) Charging carried/phase
   iii) Total charging KVAR
   The relative permittivity of insulation is 3. **(10 Marks)**

Module-5

9 a. Explain radial distribution system. State its merits and demerits. **(10 Marks)**

   b. A 2-wise D.C distributor cable AB is 2km long and supplies loads of 100A, 150A, 200A and 50A situated 500m, 1000m, 1600m and 2000m from the feeding point A. Each conductor has a resistance of 0.01Ω per 1000m. Calculate the p.d at each load point if a p.d of 300V is maintained at point A. **(10 Marks)**

OR

10 a. Define Reliability, power Quality and Reliability aids. **(08 Marks)**

   b. What are the limitations of distribution system? **(08 Marks)**

   c. Write a short note on Bath tub curve? **(04 Marks)**

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