USN | | | | | | | | | |                                      **15EE43**

## Fourth Semester B.E. Degree Examination, Dec.2018/Jan.2019
## Transmission and Distribution

Time: 3 hrs.                                                Max. Marks: 80

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

### Module-1

1   a.  Explain with the help of a neat diagram and typical transmission and distribution system scheme indicating the standard voltages. **(05 Marks)**
    b.  With neat diagram, explain Feeders, Distributors and service Mains. **(03 Marks)**
    c.  The towers of height 30m and 90m respectively support transmission line conductor's at water crossing. The horizontal distance between the tower is 500m. If the tension in the conductor is 1600kg, find the minimum clearance of the conductor and water and clearance midway between the support weight of conductor is 1.5kg/m, Bases of the towers can be considered to be at water level. **(08 Marks)**

### OR

2   a.  Explain the advantages of (i) ACSR    (ii) AAAC    iii) ZTAI    iv) GTACSR (v) GZTACSR **(05 Marks)**
    b.  With neat diagram derive a expression for the sag when the supports are at equal heights. **(05 Marks)**
    c.  Explain the classification of Insulators? Define string efficiency? Methods of improving string efficiency. **(06 Marks)**

### Module-2

3   a.  With neat diagram. Develop an expression for Inductance of a 3 phase over head line with unsymmetrical spacing. **(06 Marks)**
    b.  Explain the concept of (i) Self GMD    (ii) Mutual GMD. **(04 Marks)**
    c.  Calculate the Inductance of each conductor in a 3 phase 3 wire system when the conductors are arranged in a horizontal plane with spacing such that $D_{31}$ = 4m, $D_{12}$ = $D_{23}$ = 2m, the conductors are transposed and have a diameter of 2.5cm. **(06 Marks)**

### OR

4   a.  With neat diagram Develop an expression for capacitance of a 3 phase over head line with symmetrical and unsymmetrical spacing. **(10Marks)**
    b.  A 3phase, 50Hz, 66kV overhead line conductors are placed in horizontal plane as shown in Fig Q4(b)

$$\mid\!\!\leftarrow 2m \rightarrow\!\mid\!\leftarrow 2.5m \rightarrow\!\mid$$
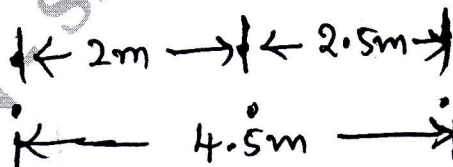$$\mid\!\!\leftarrow \quad 4.5m \quad \rightarrow\!\mid$$

Fig Q4(b)

The conductor diameter is 1.25cm. if the line length is 100km, calculate :
(i) Capacitance per phase  (ii) Charging current per phase. Assuming complete transposition of the line. **(06 Marks)**

## Module-3

5  a. Show how regulation and transmission efficiency are determined for medium transmission line using nominal T method. Illustrate your answer with suitable vector diagram. **(05 Marks)**

   b. A 3 phase, 50Hz, 150km line has a resistance inductive reactance and capacitive shunt admittance of $0.1\Omega$, $0.5\Omega$ and $3 \times 10^{-6}$ S per km per phase. If the line delivers 50mW at 110kV and 0.8pf lagging. Determine the sending end voltage and current. Assume a nominal $\pi$ circuit of the line. **(08 Marks)**

   c. Differentiate the types of over head transmission lines. **(03 Marks)**

### OR

6  a. Develop the Generalized circuit constants for (i) short transmission line  (ii) Medium line – nominal T method. **(08 Marks)**

   b. Find the following for a single circuit transmission line delivering a load of 50MVA at 110kV and p.f 0.8 lagging:
   (i) Sending end voltage          (ii) Sending end current       (iii) Sending end power
   (iv) Efficiency of transmission.
   Given A = D = $0.98\underline{|3^\circ}$ B = $110\underline{|75^\circ}$ $\Omega$, C = $0.0005\underline{|80^\circ}$ Siemen. **(08 Marks)**

## Module-4

7  a. What is Corona? What are the factors which affect Corona? **(04 Marks)**

   b. Explain the following terms with reference to corona
   (i) Critical disruptive voltage
   (ii) Visual critical voltage **(06 Marks)**

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

### OR

8  a. With neat diagram, show the various parts of high voltage single core cable. **(04 Marks)**

   b. Define Grading of cables, Analyze capacitance Grading. **(08 Marks)**

   c. Write the comparison between ac and dc cables. **(04 Marks)**

## Module-5

9  a. With neat diagram, explain the concept of AC distributor. With concentrated loads. **(08 Marks)**

   b. A single phase ac distributor AB 300 meters long is fed from End A and is loaded as under
   i) 100A at 0.707 pf lagging 200m from point A
   ii) 200A at 0.8pf lagging 300m from point A
   The load resistance and reactance of the distributor is $0.2\Omega$ and $0.1\Omega$ per kilometer. Calculate the total voltage drop in the distributor. The load power factor refer to the voltage at the far end. **(08 Marks)**

### OR

10 a. Define reliability, power Quality. **(06 Marks)**

   b. Limitations of Distribution systems. **(07 Marks)**

   c. Explain the effect of disconnection of natural in a 3 phase four wire system. **(03 Marks)**

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