Code No: 128BH

R15

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
B. Tech IV Year II Semester Examinations, May - 2019
EHV AC TRANSMISSION
(Electrical and Electronics Engineering)

Time: 3 hours   Max. Marks: 75

Note: This question paper contains two parts A and B.
Part A is compulsory which carries 25 marks. Answer all questions in Part A. Part B
consists of 5 Units. Answer any one full question from each unit. Each question carries
10 marks and may have a, b, c as sub questions.

PART - A

(25 Marks)

1.a)   What is the necessity of EHV AC Transmission?   [2]
  b)   Derive the expression for equivalent radius of a bundle conductor.   [3]
  c)   Write the charge potential relation of a multi conductor line.   [2]
  d)   Derive the cosine law of variation of 'E' with 'θ'.   [3]
  e)   What is Corona?   [2]
  f)   Draw Bode frequency plot of positive and negative corona pulses.   [3]
  g)   Write short notes on travelling waves in EHV.A.C lines.   [2]
  h)   An overhead line with Z_0=500 ohms continues into a cable with Z_c=200 ohms. A surge
        with a crest value of 2000 kV is coming towards the junction from the overhead line.
        Calculate the voltage in the cable.   [3]
  i)   Write short notes on Static Reactive compensating system.   [2]
  j)   Draw the diagram showing extra long line with shunt reactors at ends and at an
        intermediate station.   [3]

PART - B

(50 Marks)

2.   The dimensions of the 3-phase, 400 kV horizontal line shown in the figure are
        H= 15 m, S = 11 m phase separation, Conductor is 2×3.18 cm diameter, Bundle spacing
        B= 45.72 cm. Calculate the matrix of inductance per km for transposed and un transposed
        lines.   [10]
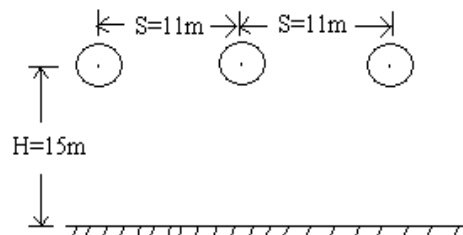
OR

3. Write down the procedure for diagonalization of Inductance matrix L= $\begin{bmatrix} L_S & L_m & L_m \\ L_m & L_S & L_m \\ L_m & L_m & L_S \end{bmatrix}$

    of a transposed line.   [10]

4. Derive the expression for voltage (charge voltage relation) of two conductor line. [10]

OR

5. Starting from the fundamentals derive the expression for potential relations for multi conductor lines.   [10]

6.a) Explain in detail generation characteristics and limits of AN.
  b) Discuss the Corona loss formulae.   [5+5]

OR

7.a) Explain in detail the measurement of Audible Noise.
  b) Explain the corona pulses, their generation and properties.   [5+5]

8. Derive the expression for total electrostatic field component of a 3-phase, single circuit AC line.   [10]

OR

9. Derive the expressions for induced voltages in the un energized line when only one circuit is energized in the double circuit line.   [10]

10.a) Explain cascade connection of components in shunt and series compensation.
   b) Explain the power circle diagram and its use in voltage control.   [5+5]

OR

11.a) Explain the voltage control using synchronous condenser.
   b) Explain the sub synchronous resonance in a series capacitor.   [5+5]

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