[4959]-1070

B.E. (Electrical)

EXTRA HIGH VOLTAGE AC TRANSMISSION

(2012 Course) (Semester - I)

Time : 2½ Hours]   *[Max. Marks : 70*

Instructions to the candidates:

  1) *Answer all questions.*
  2) *Answer Q1 or Q2, Q3 or Q4, Q5 or Q6, Q7 or Q8.*
  3) *Neat diagrams must be drawn wherever necessary.*
  4) *Figures to the right indicate full marks.*
  5) *Assume suitable data, if necessary.*
  6) *Use of calculator is allowed.*

Q1) a) Explain the significance of bundled conductor in EHVAC transmission system. **[6]**

  b) Describe measures taken to minimize the damage due to the different types of vibrations of the transmission line. **[7]**

  c) A 345-kV line has an ACSR Bluebird conductor 0.04477 m in diameter with an equivalent radius for inductance calculation of 0.0179 m. The line height is 12 m. Calculate the inductance per km length of conductor and the error caused by neglecting the internal flux linkage. **[7]**

OR

Q2) a) Explain the factors affecting vibrations of the conductors. **[6]**

  b) Explain the field of a point charge and its properties. **[7]**

  c) A point charge $Q = 10^{-6}$ coulomb is kept on the surface of a conducting sphere of radius r = 1 cm, which can be considered as a point charge located at the centre of the sphere. Calculate the field strength and potential at a distance of 0.5 cm from the surface of the sphere. Also find the capacitance of the sphere, $\epsilon_r = 1$. **[7]**

P.T.O.

Q3) a) Explain the terms primary shock current, secondary shock current and let-go current in detail. **[8]**

b) Derive the expression for voltages induced in the conductors of un energized circuit of double circuit three phase line. **[8]**

OR

Q4) a) Explain the effect of high electrostatic field on humans, animals, and plants. **[8]**

b) Derive the expression for electrostatic Field of Double-Circuit 3-phase A.C. line. **[8]**

Q5) a) Explain the mechanism of corona formation in detail. **[8]**

b) Write a note on 'Measurement of Audible Noise'. **[8]**

OR

Q6) a) Draw a charge - voltage diagram and derive an expression

$$P_c = \frac{1}{2} KC(V_m{}^2 - V_0{}^2)$$ for corona loss. **[8]**

b) Explain attenuation of travelling waves due to corona loss. **[8]**

Q7) a) Explain the design factors under steady state with necessary expressions. **[9]**

b) Name the materials used for insulation in E.H.V. cables; and state the properties of SF_6 gas as an insulating in cables. **[9]**

OR

Q8) a) Brief, line insulation design based upon transient over voltages. **[9]**

b) Explain detail classification of cables and mention typical insulation thickness for E.H.V. cables. **[9]**

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