

Total No. of Questions : 8]

P6590

SEAT No. :

[Total No. of Pages : 2

[6181]-141

B.E. (Electrical)

EHV AC TRANSMISSION

(2019 Pattern) (Semester - VIII) (Elective - VI) (403151 (A))

Time : 2½ Hours]

[Max. Marks : 70

Instructions to the candidates:

- 1) Answer all questions.
- 2) Answer Q.1 or Q.2 and Q.3 or Q.4 and Q.5 or Q.6 and Q.7 or Q.8.
- 3) Neat diagram 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 surface voltage gradient on single conductor. [8]

b) Explain Field of sphere gap and also derive equation as $S_1 S_2 = R^2$. [8]

OR

Q2) a) Derive the condition for maximum charge on EHV conductor of three phase line in terms of elements of matrix [M] where $[M] = [P]^{-1}$ and [P] is maxwell's potential coefficient matrix. [8]

b) Determine Surface voltage Gradient on conductors under Mangoldt (Markt-Mengele) Formulae. [8]

Q3) a) Evaluate the horizontal, vertical and total value of electrostatic field components near the single circuit transmission line, which are energized by three phase voltages. [9]

b) Derive expression for electrostatic induction on an energized circuit of double circuit line. [9]

OR

Q4) a) Derive the expression for magnetic field calculation of horizontal configuration of Single circuit of three phase lines. [9]

b) Discuss effect of high electrostatic field on: [9]

- i) Humans
- ii) Animals
- iii) Plants

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- Q5) a)** Explain the corona formation and methods to reduce the corona effects. [9]
b) Draw a charge-voltage diagram and derive an expression $P_c = 1/2 KC (V_m^2 - V_o^2)$ for corona loss. [9]

OR

- Q6) a)** With the help of simple block diagram, explain the audible noise measuring circuit in EHV AC lines. [9]
b) State and explain at least 4 formulae for power loss due to corona. [9]

- Q7) a)** Write note on various properties of XLPE used in EHV cables. [9]
b) Name the materials used for insulation in E.H.V cables; and state the properties of SF6 gas as an insulating in cables. [9]

OR

- Q8) a)** State and Explain at least four factors to be considered in the design of EHV lines based upon the steady state limits. Also state their limiting value. [9]
b) Define $\tan \delta$ loss factor and derive an expression for insulation resistance of a cable. [9]
