

Total No. of Questions : 8]

SEAT No. :

P3914

[5561]-584

[Total No. of Pages : 2

B.E. (Electrical)

EHV AC TRANSMISSION

(2015 Pattern) (Semester-I) (Elective-II) (403144)

Time : 2½ Hours]

[Max. Marks : 70

Instructions to the candidates:

- 1) *Attempt Q. 1 or Q. 2, Q. 3 or Q. 4, Q.5 or Q. 6, Q. 7 or Q. 8.*
- 2) *Neat diagrams must be drawn wherever necessary.*
- 3) *Figures to the right indicate full marks.*
- 4) *Assume suitable data, if required.*
- 5) *Use of calculator is allowed.*

- Q1)** a) Explain the concept of travelling waves and derive expression for equations of travelling waves. [8]
- b) Describe the measures taken to minimize the damage due to different types of vibrations of the transmission line. [8]
- c) The field strength on the surface of a sphere of 1 cm radius is equal to the corona inception gradient in air of 30 KV/cm. Find the charge on the sphere. [4]

OR

- Q2)** a) Derive expression for inductance of multi conductor lines and state Maxwell's coefficients. [8]
- b) Prove that a one 750 KV line power handling capacity of a.c. transmission line carry as much power as four 400 KV circuits for equal distance of transmission. [6]
- c) A charge of 25 μC is placed at a distance of 5 m from the center of a sphere. The radius of a sphere is 1.5 m. Calculate the magnitude, polarity and location of a point charge Q2 which will make the sphere at zero potential. [6]

- Q3)** a) Derive the expression for electrostatic induction on unenergized circuit of a double circuit line. [7]
- b) Discuss the effects of high electrostatic field on: [9]
- i) Humans ii) Animals iii) Plants

OR

P.T.O.

- Q4)** a) Explain the concept of insulated ground wire and explain the purposes served by insulated ground wire. [7]
- b) Explain the terms in detail: [9]
- i) Primary shock current
 - ii) Secondary shock current
 - iii) Let-go currents

- Q5)** a) Explain formation of corona and define terms: [8]
- i) Disruptive corona voltage
 - ii) Visual corona voltage
- b) Draw a charge-voltage diagram and derive an expression $P_c = 1/2 KC (V_m^2 - V_0^2)$ for corona loss. [8]

OR

- Q6)** a) With the help of simple block diagram, explain the audible noise measuring circuit in EHV AC lines. [8]
- b) State and explain at least 4 formulae for power loss due to corona. [8]

- Q7)** a) Write note on various properties of XLPE used in EHV cables. [6]
- b) Define $\tan \delta$ loss factor and derive an expression for insulation resistance of a cable. [6]
- c) Name the materials used for insulation in EHV cables and state the properties of SF₆ gas as an insulating material used in cables. [6]

OR

- Q8)** a) Explain detail classification of cables and mention typical insulation thickness for EHV cables. [6]
- b) Explain in detail properties of cable insulation materials. [6]
- c) Brief, the line insulation design based upon transient over voltages. [6]

