Total No. of Questions : 8]

SEAT No. : [ ]

P3914

[Total No. of Pages : 2

[5561]-584
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 $Pc = 1/2\ KC\ (Vm^2\text{-}Vo^2)$ 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 δ 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]**