Total No. of Questions :8]

SEAT No. :

P3315

[Total No. of Pages :2

[5670] -584
B.E. (Electrical)
EHV AC TRANSMISSION
(2015 Pattern) (Semester-I) (Elective-II) (EndSem.) (403144C)

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 and 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) Prove that power handling capacity of Transmission line increases in accordance with transmission line voltage. **[8]**

b) Explain temperature rise of EHV conductors using heat balance equation. **[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) Explain the concept of travelling waves and derive expression for equations of travelling waves. **[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) Evaluate the horizontal, vertical and total value of electrostatic field components near the single circuit transmission line which are energized by three phase voltages. **[7]**

b) Discuss the effects of high electrostatic field on animals, plants and humans in detail. **[9]**

OR

P.T.O.

Q4) a) Explain the terms in detail: **[9]**

i) Primary shock current

ii) Secondary shock current

iii) Let-go currents

b) Explain the concept of insulated ground wire and explain the purposes served by insulated ground wire. **[7]**

Q5) a) Explain formation of corona and define terms **[8]**

i) Disruptive corona voltage

ii) Visual corona voltage

b) With the help of simple block diagram, explain the audible noise measuring circuit in EHV AC lines. **[8]**

OR

Q6) a) Explain the corona formation and attenuation of travelling waves due to corona loss. **[8]**

b) Explain Charge-voltage diagram. Derive an expression for corona loss for ac voltage of conductor and compare it with Ryan Hen line formula. **[8]**

Q7) a) Brief, the line insulation design based upon transient over voltages. **[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 materials used in cables. **[6]**

OR

Q8) a) Explain detail classification of cables and mention typical insulation thickness for EHV cables. **[6]**

b) State and explain factors to be considered in the design of EHV lines based upon steady state limits. Also state their limiting vlaues. **[6]**

c) Write note on various properties of XLPE used in EHV cables. **[6]**

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