(Following Paper ID and Roll No. to be filled in your Answer Book)

PAPER ID : 121505

Roll No.

B. Tech.

(SEM. V) (ODD SEM.) THEORY EXAMINATION, 2014-15

ELEMENTS OF POWER SYSTEM

Time : 3 Hours]   [Total Marks : 100

1   Attempt any **four** parts :   5×4=20

   (a)   What is Skin effect?

   (b)   State Kelvin's law for size of transmission conductor

   (c)   Define Critical disruptive voltage

   (d)   What are the types of conductors?

   (e)   Brief Proximity effect

   (f)   What are the different kinds of supply system ?

2   Attempt any **two** parts :   10×2=20

   (a)   Discuss in detail the problem associated with EHVAC Transmission. Also state how it is solved

(b) State what are the types of HVDC links?

(c) State what the various grounding practices adopted? What is an earthing transformer?

3 Attempt any **two** parts : 10×2=20

(a) Derive the expression for insulation resistance, capacitance and electrostatic stress of a single core cable .

(b) Write short notes on :

    (1) Ring main distributor,

    (2) Current distribution in a 3-wire dc system

    (3) Three phase 4-wire ac distribution and

    (4) Balancers

4 Attempt any **two** parts : 10×2=20

(a) A transmission line uses a hard drawn copper of area of cross-section of $200 mm^2$ with a conductor 61/2.24 mm. The span of the line is 160 m with supports at the level. The maximum stress for a conductor is $41 kg/mm^2$ with a factor of safety of 5. Calculate : (a) Sag in still air, (b) Sag with a wind pressure of 1.35 kg/m and ice coating of 1.25 cm (c) Vertical Sag with conditions as in (b) above.

(b) Derive the calculation of Sag for Catenary Shape of Conductor

(c) Explain Ferranti effect and Surge impedance loading in power system lines.

5 Attempt any **two** parts : 10×2=20

(a) Derive the expression for the inductance of three phase line with conductors untransposed. What is the significance of imaginary term In the expression for inductance? Hence derive the expression for inductance for a completely transposed line

(b) Derive the expression for capacitance of unsymmetrically and symmetrically spaced three phase lines. Compare the results.

(c) Derive the expression for the regulation and efficiency of a short transmission line. Draw the required circuit and phasor diagram.

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