Total No. of Questions : 6]

SEAT No. :

P5873

[Total No. of Pages : 2

BE/Insem./Oct.-567

B.E. (Electrical)

EHV AC TRANSMISSION

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

Time : 1 Hour] *[Max. Marks : 30*

Instructions to the candidates:

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

Q1) a) Explain different types of vibrations of transmission conductors in brief. **[5]**

b) Explain the need of EHV transmission lines. **[5]**

OR

Q2) a) Write a short note on spacers and dampers. Draw the neat sketches. **[5]**

b) A power of 4600 MW is to be transmitted over a distance of 1200 km. The alternative used is 3 phase 400 kV AC line. Suggest the number of circuits required with 60 % series capacitor compensation. Assume average values of resistance and reactance of conductor as 0.031 ohm/ph/km & 0.327 ohm/ph/km respectively. And phase difference between sending & receiving end is 30°. **[5]**

Q3) a) Explain temperature rise of EHV conductors using heat balance equation. **[6]**

b) A 345 kv line has an ACSR Bluebird conductor 1.762 inches (0.04477 m) in diameter with an equivalent radius for inductance calculation of 0.0179 m. The line height is 12 m. Calculate the inductance per km length of conductor and error caused by neglecting the internal flux linkage. **[4]**

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OR

Q4) a) Derive an expression for internal inductance of conductor of EHV line. **[6]**

b) Calculate Geometric Mean Radius (GMR) of a bundled conductor for 750kv AC line having 4 sub conductors each of 3.46 cm diameter and sub conductor spacing 45 cm. **[4]**

Q5) a) A charge of 25 μC is placed at a distance of 5 m from the centre 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. **[4]**

b) Explain surface voltage gradient on conductors with reference to single conductor. **[6]**

OR

Q6) a) Derive the equation for electrostatic field of a point charge. **[6]**

b) 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]**

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