Total No. of Questions : 6]

SEAT No. :

P79

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OCT. -16/BE/Insem. - 134
B.E. (Electrical)
EHV AC TRANSMISSION
(2012 Course) (Semester - I) (Elective-II)

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

Instructions to the candidates:

1) ***Use of non programmable calculator is allowed.***
2) ***Solve Q1 or Q2, Q3 or Q4, Q5 or Q6.***
3) ***Figures to the right indicate full marks.***
4) ***Assume suitable data, if necessary.***

Q1) a) A power of 2000 MW is to be transmitted over 800 km. distance. Use 400 kV three phase ac line. Suggest the number of circuits required with 50 percent series capacitor compensation. Phase difference between sending end and receiving end voltage is 30°. The resistance and reactance of conductor are 0.031 ohm/km & 0.327 ohm/km respectively. **[4]**

b) Explain different types of vibrations of transmission conductors in brief. **[6]**

OR

Q2) a) Write note on dampers and spacers. Draw the neat sketches. **[4]**

b) Explain that travelling wave consists of incident and reflected components travelling in opposite directions. **[6]**

Q3) a) Calculate Geometric Mean Radius (GMR) of a bundled conductor for 400 kV AC line having two sub conductors, each of 1.59 cm radius and sub conductor spacing 45m. **[4]**

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

OR

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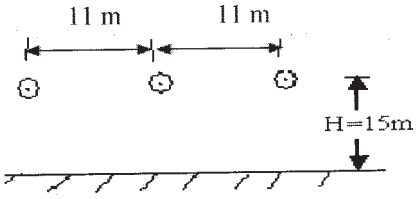
Q4) a) Derive the equation for the inductance offered to zero sequence current in a transposed line. **[4]**

b) The dimensions of a 3-phase 400-kV horizontal line as shown in fig. are: H = 15m, S = 11m phase separation, conductor 2 × 3.18cm diameter, and B = 45.72 cm. Calculate: the matrix of inductances per km, for un transposed configuration. **[6]**



Q5) a) Derive the equation for the electrostatic field of a point charge. **[6]**

b) A charge of 10 μC is placed at a distance of 2 meters from the centre of a sphere of radius 0.5 meter (1-metre diameter sphere). Calculate the magnitude, polarity, and location of a point charge Q_2 which will make the sphere at zero potential. **[4]**

OR

Q6) a) A point charge $Q = 10^{-6}$ coulomb is kept on the surface of a conducting sphere of radius r = 1 cm, which can be considered as a point charge located at the centre of the sphere. Calculate the field strength and potential at a distance of 0.5 cm from the surface of the sphere. Also find the capacitance of the sphere, $e_r = 1$. **[6]**

b) Compare line charge with point charge. **[4]**

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