

Total No. of Questions : 6]

SEAT No. :

**P225**

[Total No. of Pages : 2

**Oct./BE/Insem. - 541**

**B.E. (Electrical)**

**EHVAC TRANSMISSION**

**(2015 Pattern) (Semester - I) (403144) (Elective - II)**

*Time : 1 Hour]*

*[Max. Marks :30*

*Instructions to the candidates:*

- 1) Solve Q.1 or Q.2, Q.3 or Q.4 and Q.5 or Q.6.
- 2) Use of non programmable calculator is allowed.
- 3) Figures to the right indicate full marks.
- 4) Assume Suitable data if necessary.

**Q1) a)** Derive equations for power handling capacity, line current, power loss, % power loss in terms of line voltage, line length and line parameters for each circuit of three phase EHV line. **[4]**

b) Explain the terms Aeolian vibration, Galloping and Wake - induced Oscillations with respect to transmission line performance. **[6]**

OR

**Q2) a)** Describe measures taken to minimize the damage due to the different types of vibrations of the transmission line. **[4]**

b) A power of 12,000 MW is required to be transmitted over a distance of 1000 km. at voltage levels of 750 kV, and 1000 KV, determine the currents transmitted and the total line losses. The magnitudes for sending and receiving end voltages are equal with  $30^\circ$  phase difference. The line resistance and reactance values are given below. **[6]**

	750 kV	1000 kV
r (ohm/km)	0.0136	0.0036
x (ohm/km)	0.272	0.231

**P.T.O.**

**Q3) a)** What do you mean by bundled conductors? Give properties of these conductors and show conductor configurations used for bundles in EHV-lines. [4]

b) Derive an expression for total inductance of a solid round conductor due to internal flux and external flux linkages. [6]

OR

**Q4) a)** Calculate Geometric Mean Radius (GMR) of a bundled conductor for 1000 kv :  $N = 6$ ,  $d = 4.6 \text{ cm}$ ,  $B = 12d$ . [4]

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

**Q5) a)** The field strength on the surface of a sphere 1cm radius is equal to the corona inception gradient in air of 30 KV/cm. Find the charge on sphere. [4]

b) Explain the field of a point charge and its properties. Derive the equation for the electrostatic field of a point charge. [6]

OR

**Q6) a)** Explain surface voltage gradient on conductors with reference to single conductor. [4]

b) Derive expression for maximum charge condition on a 3 phase line. [6]

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