Total No. of Questions : 6]

**P225** 

## Oct./BE/Insem. - 541 B.E. (Electrical) EHVACTRANSMISSION

**SEAT No. :** 

[Total No. of Pages : 2

[Max. Marks :30

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

## Time : 1 Hour]

Instructions to the condidates:

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

OR

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 a equal with 30° phase difference. The line resistance and reactance values are given below. [6]

	750 kV	1000 kV	
r (ohm/km)	0.0136	0.0036	CY gov
x (ohm/km)	0.272	0.231	26.0

*P.T.O*.

- What do you mean by bundled conductors? Give properties of these *Q3*) a) conductors and show conductor configurations used for bundles in EHVlines. [4]
  - Derive an expression for total inductance of a solid round conductor b) due to internal flux and external flux linkages. [6]

## OR

- Calculate Geometric Mean Radius (GMR) of a bundled conductor for **04)** a) 1000 kv = 6, a = 4:6 cm, B = 12d.[4]
  - Explain temperature rise of EHV conductors using heat balance equation. b) [6]

The field strength on the surface of a sphere 1 cm radius is equal to the **Q5)** a) 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]
- Explain surface voltage gradient on conductors with reference to single **Q6)** a) conductor.
  - Derive expression for maximum charge condition on a 3 phase line. [6] b)

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