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Total number of printed pages – 2

B. Tech  
PCEE 4301

**Sixth Semester Regular Examination – 2014**  
**TRANSMISSION AND DISTRIBUTION SYSTEM**

**BRANCH : ELECTRICAL**

**QUESTION CODE : F 254**

**Full Marks – 70**

**Time : 3 Hours**

*Answer Question No. 1 which is compulsory and any five from the rest.  
The figures in the right-hand margin indicate marks.*

1. Answer the following questions : 2×10
- Define voltage regulation of a transmission line.
  - State two advantages of bundled conductors.
  - What do you understand by GMR and GMD stranded conductor ?
  - What is the effect of high capacitance of a transmission line ?
  - What is a stringing chart ?
  - What is meant by breakeven distance ?
  - Differentiate between a feeder and distributor.
  - What are the differences between a.c. transmission and d.c. transmission ?
  - Define insulation resistance for a cable.
  - How the substations are classified on the basis of mounting ?
2. (a) The three conductors of a 3-phase overhead line are arranged in a horizontal plane with a spacing of 4m between adjacent conductors. The diameter of each conductor is 2 cm. Determine the inductance per km per phase of the line assuming that the lines are transposed ? 5
- (b) Explain, in brief, the classification of transmission line. 5

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3. (a) Calculate the capacitance of a single-phase 50 Hz overhead transmission line 60 km long consisting two parallel wires each 8 mm in diameter and 2 meter apart .The height of conductors above the ground is 8 meters. (Ignore the effect of ground). 5
- (b) Derive transmission line constants A, B, C and D parameters for short transmission line. 5
4. A transmission line has a span of 300 m between the level supports.The conductors has an effective diameter 2 cm and weighs 0.9 kg/m. Its ultimate strength is 8000 kg. If the conductor has ice coating of radial thickness 1.5 cm and subjected to a wind pressure of 4 gm/cm<sup>2</sup> of projected area, Calculate Sag for a safety factor 2. (Weight of 1cc of ice is 0.91 gm). 10
5. (a) A three-phase overhead transmission line is being supported by three Suspension type insulators. The potential across the first and the second Insulator are 11 kV and 13.2 kV respectively. Calculate : 5
- (i) The Line voltage
- (ii) String efficiency
- (b) Explain why the voltage distribution over a string of suspension Insulators is not uniform and also define string efficiency. 5
6. (a) Show that the most economical size of conductor in a single core cable is obtained when radius of cable sheath (R) equals  $e r$ , where  $e$  is the base of natural logarithm and  $r$  is the radius of conductor ? 5
- (b) Under what circumstances are cables preferred to overhead lines for power transmission ? 5
7. (a) State and explain Kelvin's Law. Also briefly discuss its limitations. 5
- (b) Discuss the advantages of a 3 wire system as compared with two wire system for d.c. distribution network. 5
8. Write shorte notes on any **two** of the following : 5×2
- (a) Ferranti effect
- (b) Advantages of HVDC transmission
- (c) Factors affecting Soil resistivity.