Registration No. : | | | | | | | | | | |

Total number of printed pages – 2

B. Tech

PCEE 4301 (New)

Sixth Semester (Back) Examination – 2013

TRANSMISSION AND DISTRIBUTION SYSTEM

BRANCH : ELECTRICAL

QUESTION CODE : B322

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

   (a) Define voltage regulation of a transmission line.

   (b) State two advantages of bundled conductors.

   (c) What do you understand GMR and GMD stranded conductor ?

   (d) What is the effect of high capacitance of a transmission line ?

   (e) What is a stringing chart ?

   (f) What is meant by break even distance ?

   (g) Differentiate between a feeder and distributor.

   (h) What are the differences between AC transmission and DC transmission ?

   (i) Define insulation resistance for a cable.

   (j) 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 4 m 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^2 of projected area, calculate Sag for a safety factor 2. (Weight of 1 cc 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 $e \cdot r$, 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 DC distribution network. 5

8. Write short notes on any **two** : 5×2

(a) Ferranti effect

(b) Advantages of HVDC transmission

(c) Factors affecting Soil resistivity.