

Registration No. :

--	--	--	--	--	--	--	--	--	--

Total number of printed pages – 3

B. Tech
PCEE 4301

Sixth Semester Regular Examination – 2015
TRANSMISSION AND DISTRIBUTION SYSTEM
BRANCH : ELECTRICAL

QUESTION CODE : J 284

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 x 10

- What are the secondary constants of a line ? Why the line parameters are called distributed elements ?
- What is a finite line ? Write down the significance of this line.
- What are the different components of a distribution system ?
- State the advantages of double circuit line over single circuit line.
- What are the important characteristics that an overhead line insulator must provide ?
- What are the limitations of Kelvin's law ?
- Find the loop inductance and reactance per km of a single phase overhead line consisting of two conductors, each of 1.2 cm diameters. The spacing between the conductors is 1.25 m and frequency of supply is 50 Hz.
- Give two merits of HVDC transmission system over HVAC transmission system.

P.T.O.

- (i) What are the methods adopted to reduce corona ?
- (j) A 3 phase overhead transmission line is being supported by three disc insulators. The potential across top unit (i.e. near the tower) and the middle unit are 8 kV and 11 kV respectively. Calculate the string efficiency.
2. (a) A single phase 50 Hz system supplies an inductive load of 5000 kW at 0.8 pf lag through a line 25 km. $R = 0.0195 \Omega / \text{km}$ and $L = 0.63 \text{ mH/km}$. $V_R = 10 \text{ kV}$. Find the sending end voltage, regulation and transmission efficiency. 6
- (b) With a neat diagram, explain the strain and stay insulators. 4
3. A 50 Hz transmission line 400 km long total series impedance of $40 + j25 \Omega$ and total shunt admittance of 10^{-3} mho . The 220 kV with 0.8 lagging power factor. Find the sending end voltage, current, power and power factor using nominal π method. 10
4. (a) Calculate the most economical diameter of a single core cable to be used on 132 kV, 3 phase system. Find also the overall diameter of the insulation, if the peak permissible stress does not exceed 60 kV/cm. Also derive the formula used. 7
- (b) Explain the classification of lines based on their length of transmission. 3
5. (a) Calculate the sag for a span of 200 m if the ultimate tensile strength of conductor is 5788 kg. Factor of safety is 2. Weight of conductor is 600 kg/km. 5
- (b) Prove that the volume of copper required for single phase 2 wire system is more than three phase 4 wire system. 5
6. (a) Define skin effect, proximity factor, and Ferranti effect. 5
- (b) Explain the design principles of substation grounding system. 5

7. (a) A conductor is composed of seven identical copper strands each having a radius r . Find the self-GMD of the conductor. 5
- (b) With neat schematic, explain the principle of HVDC system operation. 5
8. Write short notes any **two** of the following : 5×2
- (a) Neutral grounding
 - (b) Grounding grids
 - (c) ABCD constants
 - (d) Transposition in transmission lines.


