

Code: EE4T3

II B.Tech - II Semester – Regular Examinations - JUNE 2015

**TRANSMISSION AND DISTRIBUTION
(ELECTRICAL & ELECTRONICS ENGINEERING)**

Duration: 3 hours

Marks: 5x14=70

Answer any FIVE questions. All questions carry equal marks

- 1 a) Show that the inductance of each conductor of a single phase line using composite conductor is given by $L = 2 \times 10^{-7} \ln(D_m/D_s)$, where D_m and D_s are mutual geometric mean distance between conductors and self geometric mean distance of the conductor respectively. 4 M
- b) Derive expression for the inductance per phase of a 3-phase line with (i) Equilateral and (ii) unsymmetrical spacing. Assume regular transposition in part(ii) 4 M
- c) Three conductors of a 3- phase overhead line are arranged in horizontal plane, 6 meters apart. The Diameter of each conductor is 1.24 cm. Find the capacitance per 100 km of the line in Microfarads. 6 M
- 2 a) A Single phase transmission line delivers a 2 MW of power at receiving end at a voltage of 33 KV and 0.9 pf lagging. The total resistance of the line is 10 ohms and the total inductive reactance is 18 ohms. Determine: 9 M

- i) Percentage voltage Regulation?
 - ii) Sending end power factor?
 - iii) Transmission efficiency?
- b) Derive the A, B, C, D Parameters of medium lines for nominal π method. 5 M
- 3 a) What is the surge impedance and surge impedance loading of transmission lines and Explain? 5 M
- b) A 220 KV, 3-Phase overhead Transmission line has a impedance per phase of $(20+j100) \Omega$ and admittance of $j0.0010$ mho. Using π model, Determine the sending end voltage and current when the current at the receiving end is 300 Amps at 0.9 power factor lagging. 9 M
- 4 a) What are the Disadvantages of low power factor and write any two methods for improving factor in power system? 7 M
- b) Compare the shunt compensation and series compensation for control of Reactive power? 7 M
- 5 a) Explain the Different Types of insulators with diagrams. 7 M

b) A 3-Phase overhead transmission line is being supported by three disc insulators. The potential across top unit and middle unit are 9 KV and 11 KV respectively calculate

7 M

i) the ratio of capacitance between pin and earth to the self capacitance of each unit.

ii) The line voltage and

iii) string efficiency.

6 a) Show how the sag and tension of an overhead line can be calculated in case of supports at different levels. 7 M

b) Find the weight of the conductor if the ultimate strength is 5758 kg. Sag is 2.0 meter and factor of safety is 2 and the overhead line has a span of 250 meters. 7 M

7 a) Explain the Radial and Ring main D.C Distributors with Diagrams in brief. 7 M

b) A 2-wire, D.C Distributor 1000m long is loaded uniformly at the rate of 0.4 A/m. If the voltage drop in the distributor is not to exceed 5V, Calculate the area of cross section of each conductor required when the Distributor is fed at one end. Take resistivity of a conductor material as $1.7 \times 10^{-8} \Omega\text{-m}$. 7 M

8 a) What is meant by capacitance grading of a cable? 7 M

b) The insulation Resistance of a single core cable is 459 mega ohm per km. If the core diameter is 3.5 cm and resistivity of insulation is 4.5×10^{14} ohm-cm. Find the Insulation thickness? 7 M