PVP 14

Code: EE5T5

III B.Tech - I Semester – Regular Examinations - December 2016

TRANSMISSION AND DISTRIBUTION
(ELECTRICAL & ELECTRONICS ENGINEERING)

Duration: 3 hours Max. Marks: 70

PART – A

Answer ***all*** the questions. All questions carry equal marks

11 x 2 = 22 M

1. a) What is proximity effect?
   b) What is transposition of conductors?
   c) Write ABCD constants of Medium transmission line with Nominal π network.
   d) What is Ferranti effect?
   e) What are the methods of grading of cables?
   f) Define sag and write its expression for the towers with equal height.
   g) What is corona and write power loss expression?
   h) Define wave length and velocity of propagation of waves and also write the corresponding formulae.
   i) Write the expressions for reflected and refracted currents for a line ended with T- junction.
   j) What is the difference between DC and AC distribution systems?
   k) What is the difference between concentrated loading and uniform loading?

PART – B

Answer any *THREE* questions. All questions carry equal marks. 3 x 16 = 48 M

2. a) Derive an expression for Inductance of three phase double circuit line with unsymmetrical spacing but transposed. 8 M

b) A 400 KV, 3-phase single circuit bundled conductor line with two sub-conductors per phase has a flat configuration as shown in Figure-1. The centre to centre distance between adjacent phases is 4m and distance between sub-conductors of phase is 45 cm. The radius of each sub-conductor is 1.6 cm. Find the capacitance per phase per km. 8 M

Figure-1

3. a) Derive expressions for the following in a medium transmission line using Nominal T network. 8 M

(i) Sending end voltage and current
(ii) Sending end power factor
(iii) Voltage regulation
(iv) Transmission efficiency

b) A 3-phase line, 3km long delivers 3000 kW at power factor of 0.8 (lagging) to a load. If the voltage at supply end is 11 kV, determine the voltage at the load end and efficiency of transmission. The resistance and reactance per km of each conductor are 0.4 ohm and 0.8 ohm respectively. 8 M

4. a) Describe types of Insulators. 8 M

b) The towers of height 30m and 90m respectively support transmission line conductor at water crossing. The horizontal distance between the towers is 500m. If the tension in the conductor is 1600 kg. Find the clearance of the conductor and water and clearance mid-way between the supports. Weight of the conductor is 1.5 kg/m. Bases of the towers can be considered to be at water level. 8 M

5. a) Explain variation in voltage and current transients in a line ended with open circuit. 8 M

b) A 3-phase transmission line have conductors 1.5cms in diameter and 1 metre apart in equilateral formation. The resistance and leakage reactance are negligible. 8 M

Calculate (i) The natural impedance of the line

(ii) The line current if a voltage wave of 11 kV travels along the line

(iii) The rate of energy absorption, the rate of reflection and the state and the form of reflection if the line is terminated through a star connected load of 1000Ω per phase.

(iv) The value of terminating resistance for no reflection.

6. a) Derive the expression for total voltage drop in a uniformly loaded DC distributor fed at one end. 8 M

b) A single phase ring distributor ABC is fed at A. The loads B and C are 20A at 0.8 p.f. lagging and 15A at 0.6 p.f. lagging respectively, both expressed with reference to the voltage at A. The total impedance of the three sections AB, BC and CA are (1+j1), (1+j2) and (1+j3) ohms respectively. Find the total current fed at 'A' and current in each section. Use Thevenin's theorem to obtain the result. 8 M