Code: EE5T5

## III B.Tech - I Semester – Regular/Supplementary Examinations October 2018

## 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 Skin Effect? Why is it absent in d.c. System?
   b) List out the advantages of bundled conductors.
   c) Why effect of capacitance is neglected in short transmission lines?
   d) Define surge impedance loading.
   e) What is the function of Armouring in underground cable?
   f) What is the necessity of grading in underground cables?
   g) Write the formulae for disruptive critical voltage and power loss due to corona.
   h) What is the refraction coefficient of current wave when the line is short circuited?
   i) What is the reflection coefficient of voltage wave when the line is open circuited?
   j) What is the importance of minimum potential on the distributor?
   k) What are the advantages of overhead system over underground system?

## PART – B

Answer any *THREE* questions. All questions carry equal marks.

$$3 \times 16 = 48 \text{ M}$$

2. a) Derive an expression for the inductance per phase for a 3-phase overhead transmission line when (i) conductors are symmetrically placed (ii) conductors are unsymmetrically placed but the line is completely transposed.　　8 M

   b) The 3 conductors of a 3 phase line are arranged at the corners of a triangle of sides 2.5m, 3m, and 3.5m. Calculate the inductance per km of the line when the conductors are regularly transposed? The diameter of each conductor is 1.24 cm.　　8 M

3. a) Using rigorous method, derive the expression for sending end voltage and current of a long transmission line when the receiving end parameters are taken as reference.　　8 M

   b) A single-core lead sheathed cable is graded by using three dielectrics of relative permittivity 5, 4, and 3 respectively. The conductor diameter is 2 cm and overall diameter is 8 cm. If the three dielectrics are worked at the same maximum stress of 40 kV/cm, find the safe working voltage of the cable. What will be the value of safe working voltage for an ungraded cable, assuming the same conductor and overall diameter and the maximum dielectric stress?　　8 M

4. a) Two towers of height 40 m and 30 m respectively support a transmission line conductor at water crossing. The horizontal distance between the towers is 300m. If the tension in the conductor is 1590 kg, find the clearance of the conductor at a point mid-way between the supports. Weight of conductor is 0.8 kg/m. Bases of the towers can be considered to be at the water level. 7 M

b) What are the advantages and disadvantages of corona? A certain 3-phase equilateral transmission line has a total corona loss of 53 KW at 106KV and a loss of 98 KW at 110.9 KV. What is the disruptive critical voltage? What is the corona loss at 113KV? 9 M

5. a) Derive the coefficients of reflection and refraction of voltage and current when a transmission line is short circuited. 8 M

b) What is meant by attenuation of travelling waves? Explain in brief with a suitable example. 8 M

6. a) Discuss the comparison between DC distribution and AC distribution systems. 8 M

b) A 2 wire distributor, 800m long is fed from both the ends. It is uniformly loaded at the rate of 1.1Amp/meter run. Calculate the Voltage at the feeding points A and B if the minimum potential of 230V occurs at a point C at a distance of 500 meters from end A. Resistance of the distributor is $0.1\Omega$ / km (go and return).          8 M