Reg. No:

SIDDHARTH INSTITUTE OF ENGINEERING & TECHNOLOGY:: PUTTUR
(AUTONOMOUS)
B.Tech III Year I Semester Regular Examinations November 2018
ELECTRICAL POWER TRANSMISSION SYSTEMS
(EEE)

Time: 3 hours
Max. Marks: 60

(Answer all Five Units **5 x 12 = 60** Marks)

UNIT-I

1 a Derive the capacitance of a 1-φ two wire line   6M
  b A 3- φ OHTL has its conductors arranged at the corners of an equilateral triangle of 2 meters aside. Calculate the capacitance/km/ph. Assume that radius of each conductor is 0.5cm.   6M

OR

2 a The horizontally placed conductors of a 1- φ line operating at 50Hz are having outside diameter of 1.6cm and the spacing between centers of the conductors is 6m. The permittivity of free space is 8.854×10^{-12} F/m. Determine the capacitance to ground per km of each line.   6M
  b Determine the total reactive power of the line when the conductors of the line are forming a triangle whose sides are 4,6 and 8m. Assume the diameter of the conductor as 1.2cm and the operating phase voltage is 220KV.   6M

UNIT-II

3 a Discuss in detail the nominal-π representation with neat circuit diagram and phasor diagram. Derive also its performance specifications.   12M

OR

4 Explain with an illustration there will be Ferranti Effect for an unloaded transmission line and also draw the corresponding phasor diagram.   12M

UNIT-III

5 a Develop Generalized expression to find the voltage across one disc, if the voltage across another disc is known in suspension type insulators.   6M
  b Each conductor of a 33KV, 3- φ system is suspended by a string of three similar insulators. The ratio of shunt capacitance to self capacitance is 0.1. Determine the voltage distribution across the string and percentage String efficiency.   6M

OR

6 a Explain the phenomenon of corona in EHV lines?   5M
  b What are the factors affecting corona and explain in detail.   7M

UNIT-IV

7 What is Sag? Derive the expressions for Sag when the supporting towers are of equal and unequal heights.   12M

OR

8 Determine the sag at 32.2 ^{0}C of a copper conductor erected on 45.7m span length. The wind pressure is 48.82kg/sq.metre of projected area at a temperature of 4.5^{0}C, weight of wire is 0.1156kg/metre. The working stress shall not exceed ½ the ultimate tensile strength.
Modulus of Elasticity $=1.26 \times 10^{4}$kg/mm^{2},
Coefficient of linear expansion $= 16.6 \times 10^{-6}/^{0}$C,
Ultimate stress $=42$kg/mm^{2} ,
Diameter of Conductor $=4.1$mm.   12M

UNIT-V

9 Give an elaborate discussion on types of insulating materials used for UGC and different varieties of Underground Cables.   12M

OR

10 A 3-phase, 3-core , metal sheathed cable gave the following results on test for capacitance:
   i)   Capacitance between two conductors bunched with the sheath and the third conductor is 0.4uF/km.
   ii) Capacitance between three bunched conductors and the sheath is 0.625uF/km

Determine the capacitance

a)between any two conductors with the third conductor bunched with sheath

b)between any two bunched conductors and the third conductor

c) Also calculate the charging current per phase per km when it is connected to a 10KV, 50 Hz supply.   12M

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