Code :R7310203

R7

III B.Tech I Semester(R07) Supplementary Examinations, May 2011
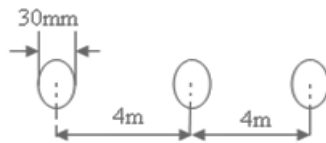**POWER SYSTEMS-II**
(Electrical & Electronics Engineering)

Time: 3 hours

Max Marks: 80

Answer any FIVE questions
All questions carry equal marks
⋆ ⋆ ⋆ ⋆ ⋆

1. (a) Derive the expression for flux linkages of one conductor in a group of n-conductors.

   (b) Determine the capacitance and charging current per unit length of the, line when the arrangement of the conductor as shown in figure.

2. Derive the expressions for A,B,C,D parameters of a nominal -T and π of a medium length transmission lines.

3. A 50Hz 3-phase transmission line is 280km long. It has a total series impedance of (35+j140)ohms and a shunt admittance of 930×10^{-6}ohm. It delivers 40MW at 220kV with 90% power factor lagging. Determine the following for a long line
   (i) sending end voltage
   (ii) voltage regulation
   (iii) transmission efficiency
   (iv) A, B, C, D constants

4. Discuss the phenomenon of reflection and refraction in travelling waves. Derive the expressions for reflection and refraction coefficients when a travelling wave is terminated through a resistance.

5. (a) Explain the effect of shunt compensation on the transmission lines.

   (b) A certain 3-phase equilateral transmission line has a total corona loss of 53 kw at 106 kv and a loss of 98 kw at 110.9 kv. What is the disruptive critical voltage? And what is the corona loss at 113kv.

6. (a) Show that in a string of suspension insulators, the current in the lowest unit (nearest to the power conductor) is maximum and also the voltage drop is maximum.

   (b) It is required to grade a string having seven suspension insulators. If the pin to earth capacitance are equal to C, determine the line to pin capacitance that would give the same voltage across each insulator of the string.

7. (a) How can the effect of wind and ice loadings be taken in to account for calculating Sag on an Overhead lines

   (b) An overhead line has a span of 260 m; the weight of the line conductor is 0.68 kg per meter run. Calculate the maximum sag in the line. The maximum allowable tension in the line is 1550kg

8. (a) Explain briefly the intersheath grading of a cable.

   (b) Calculate the capacitance and charging current of a single core cable used on a 3-phase, 66 kv system. The cable is 1 km long having a core diameter of 10 cm and an impregnated paper insulation of thickness 7 cm. The relative permittivity of the insulation may be taken as 4 and the supply at 50 Hz.

⋆ ⋆ ⋆ ⋆