(c) What is the percentage saving in feeder Copper if the line voltage in a 2-wire D.C. system be raised from 220 V to 500 V for the same power transmitted ?

UNIT - II

2 (a) Show that an overhead line conductor stung between two level supports takes up the shape of a parabola obtain the expression for the sag and maximum tension when the supports are at the same level.

(b) Calculate the horizontal component of the tension for maximum sag for a span of 300 m if the maximum tension in the conductor be 3300 kg and weight of conductor is 700 kg/km. Determine also the location of the points on the conductor at which the sag will be half of the above value.

OR

2 (a) What are the sources of vibrations in a transmission line ? Explain the methods used to damp out these vibrations.

(b) Write short notes on :

(i) Stringing chart

(ii) Types of conductor material used in transmission line.

(iii) Factors affecting the sag in overhead line.

UNIT - III

3 (a) Derive an expression for the inductance of a double circuit three phase, 4 line whose conductors are situated at the corners of a regular hexagonal.

(b) A two conductor single phase line operates at 50 Hz. The diameter of each conductor is 20 mm and the spacing between the conductors is 3 m. Calculate :

(i) Inductance of each conductor per km

(ii) The loop inductance of the line per km

(iii) The inductive reactance per km

(iv) The loop inductance per km of the line when the conductor material is steel of relative permeability 50.

OR

3 (a) Write short note on any of the two :

(i) Proximity effect

(ii) Effect of the earth on the capacitance of transmission line

(iii) Transposition of conductors.

(b) A part of the transposition of the cycle of a three phase double circuit line is shown in Fig. 1. Radius of the each conductor is 0.9 cm. The conductors are solid copper. Find the inductance per phase per km of line.

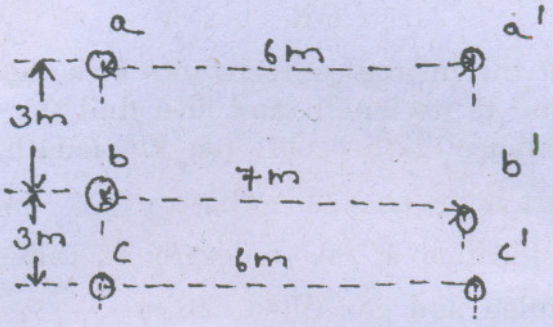

Fig. 1

UNIT - IV

4 (a) Draw equivalent π network for transmission line which has transformer at both ends. Also find the ABCD parameter of the transmission line.

(b) A three phase, 132 kV, 50 Hz, 150 km long transmission line consists of three standard aluminium conductors spaced triangularly at 3.8 m between centers. Each conductor has a diameter of 19.53 mm. The surrounding air is at a temperature of 30° C and at the barometric pressure of 750 mm of Hg. If the breakdown strength of the air is 21.1 kV (rms) per cm and the surface factor is 0.85, determine the critical disruptive voltage. Also determine the visual critical voltage for local and general corona if the surface factors are 0.72 and 0.82 for visual corona (local) and visual corona (general) respectively.

OR

4 (a) Explain corona loss at extra high voltages and its disadvantages. How is disruptive critical voltage estimated ?

(b) A single phase load of 200 kVA is delivered at 2500 V over a transmission line having R = 1.4 Ω, X = 0.8 Ω. Calculate the current, voltage and power factor at the sending end when the power factor of the load is (a) unity, (b) 0.8 leading.