Birzeit University
Faculty of Engineering
Electrical Engineering Department
Power Systems
Quiz #1

26 October 2015 **Dr. Jaser A. Sa'ed** **Time: 30 min**

Student Name: **ID Number:**

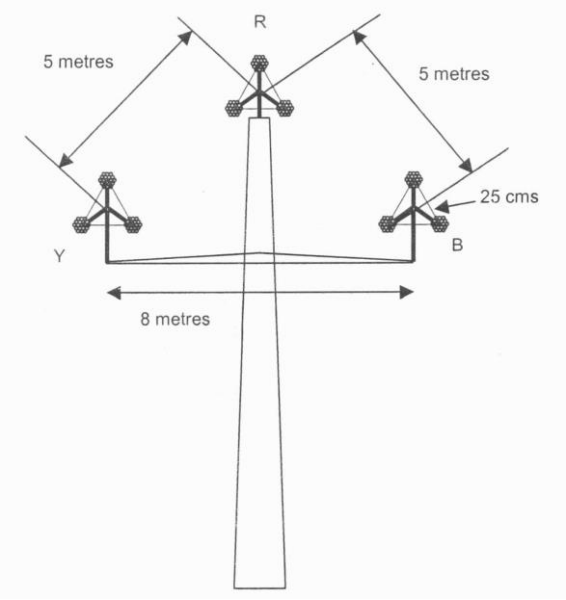
Question: Transmission Line Parameters

A bundled three phase line with three conductors per phase shown in figure below is operating at 50 Hz, and a conductor temperature of 70 ^{o}C, 300 km long. The spacing between the bundle centres is 5, 5 and 8 meters.

The three conductors in each phase are ACSR 84/19 (Al/St) Bluebird conductors spaced 25 cm apart forming an equilateral triangle. The Bluebird conductor has an outside diameter of 10 mm; stranding of 84/19 (Al/St) yields a GMR for the conductor of 3.9 mm. The resistance of each conductor in the three-conductor bundle is 0.12 Ω/km.

a) Determine the resistance per phase.
b) Calculate the inductance (in mH/km) and reactance (in ohm/km) of the line.
c) Calculate the capacitive reactance.

Note: $\mu_0 = 4\pi \times 10^{-7}$ H/m and $\varepsilon_0 = 8.854 \times 10^{-12}$ F/m.



With Best Wishes