Assigned Code:_____

Department of Electrical and Computer Engineering
Breadth Exam / Comprehensive Exam

Problems ------ Power Systems Area ECGR 4141: Power System Analysis I

A 115 kV_{LL}, 60-Hz 3-phase transmission line is 120 km long. It may be considered as a "*medium*" length line and represented as a nominal-π model. The line has the following known parameters per phase:

$z = (0.06 + j0.56)\ \Omega/km$ $y = (0 + j6.1 \times 10^{-6})$ S/km to neutral.

The line delivers 140 MVA at 120 kV (L-L) with a power factor of 0.8 lagging at the receiving end of the line.

(a) (40 pts) Find the A, B, C, and D constants of the line. Mention units for all quantities as appropriate.

(b) (35 pts) Find the sending end voltage magnitude V_S in $kV_{LN.}$

(c) (25 pts) Find per cent voltage regulation.