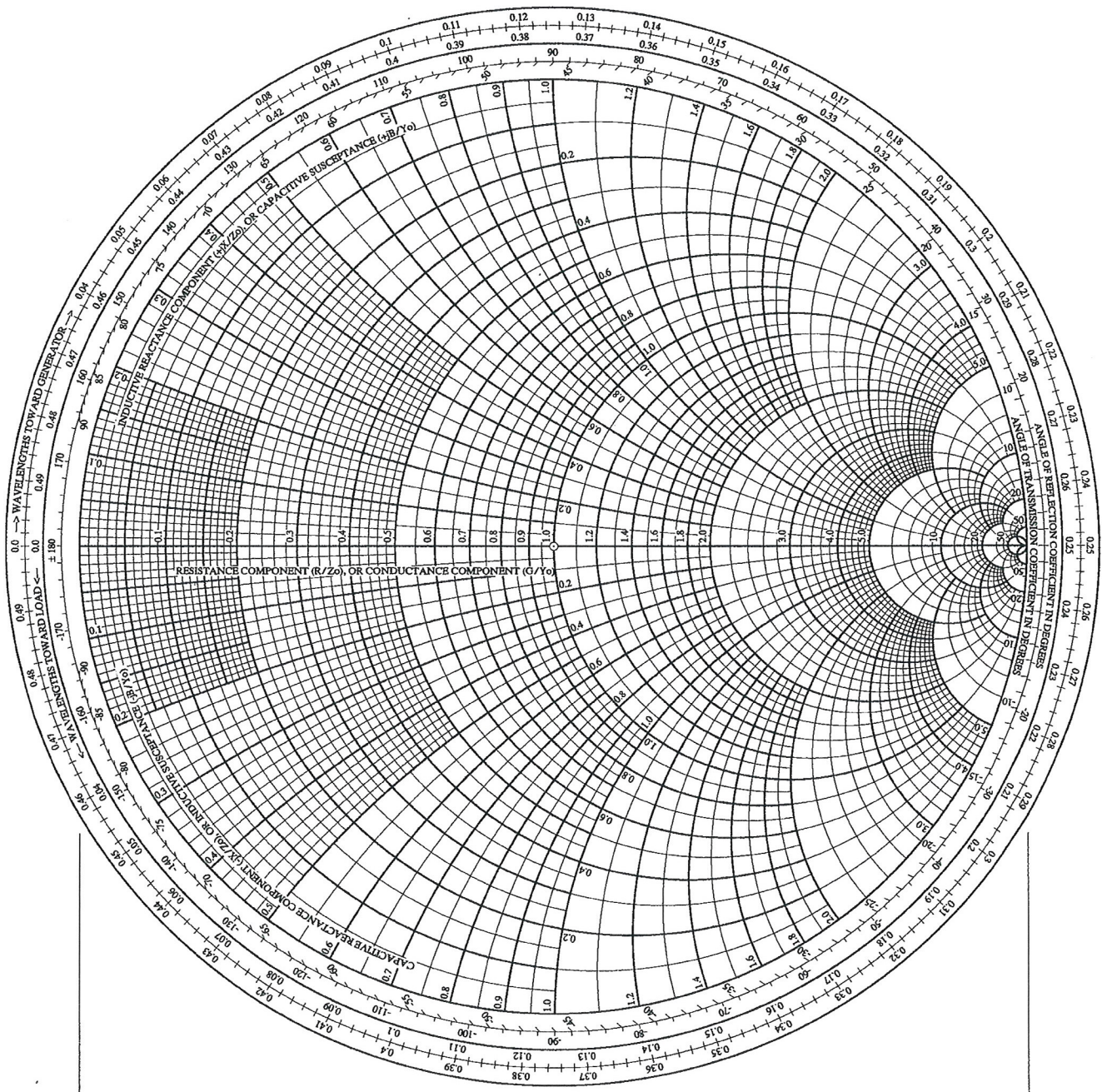# Qualifying Exam Spring 2012: Transmission Lines, Fields and Waves

Note that $\epsilon_0 = 8.8542 \cdot 10^{-12}$ F/m, and $\mu_0 = 4\pi \cdot 10^{-7}$ H/m.

1. A 50Ω transmission line at 100 MHz, with the transmission line velocity 1×10^8 m/s is terminated in a load 40-j30 Ω.

   (a) What is the voltage standing wave ratio of this load? (0.5 pionts)

   (b) Design a single shunt short circuit stub matching circuit using the Smith Chart. (1.5 points)

   (c) What is the input impedance at stub terminals of the load and the stub if the frequency drops to 90 MHz? Assume the line impedance remains at 50 Ω, the load impedance becomes 40-j33.3 Ω, and the stub length and distance from the stub to the load remain the same as obtained in the (b) above. (2.0 points)

Smith Chart

RADIALLY SCALED PARAMETERS