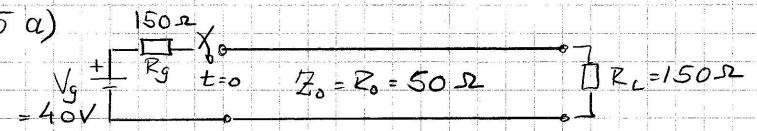
Solutions for Exam 7-May-2013 – Transmission Lines – Final

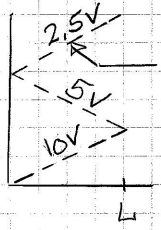
5 a)

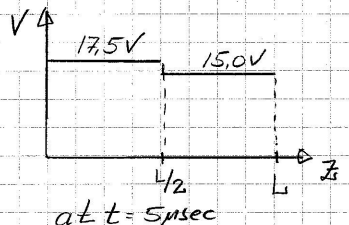


$$T = \frac{L}{c} = \frac{600}{3\cdot 10^8} = 2\cdot 10^{-6}\,s = 2\,\mu sec.$$

$$\Gamma_g = \frac{R_g - R_0}{R_g + R_0} = \frac{150-50}{150+50} = +0{,}5 \qquad \Gamma_L = \frac{R_L - R_0}{R_L + R_0} = \frac{150-50}{150+50} = +0{,}5$$

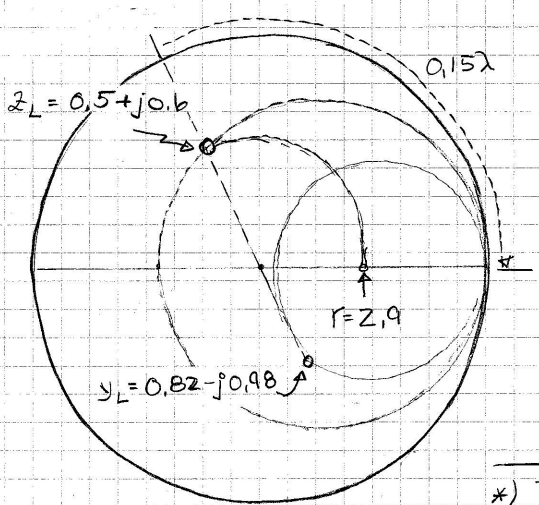
$$V_1^+ = V_g \frac{R_0}{R_g + R_0} = 40 \cdot \frac{50}{150+50} = 10V.$$





at t = 5μsec

5b) $Z_L = 25 + j30\,\Omega \Rightarrow z_L = \frac{1}{R_0} \cdot Z_L = 0{,}5 + j\,0{,}6.$



$$Y_L = \frac{1}{R_0} \cdot Y_L = 16{,}4 - j\,19{,}6\,mS$$

$d = 0{,}15\lambda$

$R^{*)} = R_0 \cdot r = 145\,\Omega$

*) The test incorrectly labelled this resistance as G, but it should read R. This was corrected during the exam.