Homework #5

1. Problem 2.63 in 7/E and 6/E (i.e. 2.45 in 5/E, images below, and the answer sheet)

2.45* A 50-Ω lossless line 0.6λ long is terminated in a load with $Z_L = (50 + j25)$ Ω. At 0.3λ from the load, a resistor with resistance $R = 30$ Ω is connected as shown in Fig. 2-43. Use the Smith chart to find $Z_{in}$.

![Circuit diagram for Problem 2.45](image)

Figure 2-43: Circuit for Problem 2.45.

2. Problems 2.68 AND 2.69 in 7/E and 6/E (i.e. 2.46 and 2.47 in 5/E, image below, and the answer sheet)

2.46 A 50-Ω lossless line is to be matched to an antenna with $Z_L = (75 - j20)$ Ω using a shorted stub. Use the Smith chart to determine the stub length and distance between the antenna and stub.

2.47* Repeat Problem 2.46 for a load with $Z_L = (100 + j50)$ Ω.
3. Problem 2.72 AND 2.73 in 7/E and 6/E (i.e. 2.48 and 2.49 in 5/E, image below, and the answer sheet)

![Diagram of network for Problem 2.48.](image)

Figure 2-44: Network for Problem 2.48.

2.48 Use the Smith chart to find $Z_{in}$ of the feed line shown in Fig. 2-44. All lines are lossless with $Z_0 = 50 \, \Omega$.

2.49* Repeat Problem 2.48 for the case where all three transmission lines are $\lambda/4$ in length.