School of Engineering
Department of Electrical and Computer Engineering

332:221 **Principles of Electrical Engineering I** **Fall 2012**
Quizlette 3

USING A CALCULATOR WILL SLOW YOU DOWN! Final answers must appear in the appropriate box. Show your work outside the box.

1. **Basic Stuff:** Please answer the following questions about FIGURE 1.

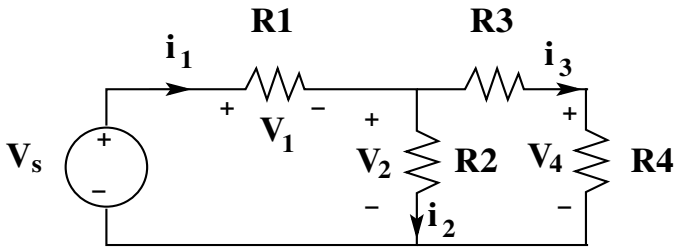

Figure 1: Circuit diagram for problem 1

(a) *(1 pt)* (TRUE/FALSE) $R3$ is in series with $R4$: **T**

(b) *(1 pt)* (TRUE/FALSE) $R2$ is in parallel with $R4$: **F**

(c) *(1 pt)* What is V_2 in terms of i_1, $R2$, $R3$ and $R4$?

$$V_2 = i_1 R_2 \frac{R_3+R_4}{R_2+R_3+R_4}$$

(d) *(2 pts)* If $R1 = R3 = R4 = 1$ and $R2 = 2$, what is i_1 in terms of V_s?

$$i_1 = V_s/2$$

2. **Getting Cute:**

For the two-port network shown in FIGURE 2(a), you are told

$$V_1 = H_{11}I_1 + H_{21}I_2$$
$$V_2 = H_{12}I_1 + H_{22}I_2$$

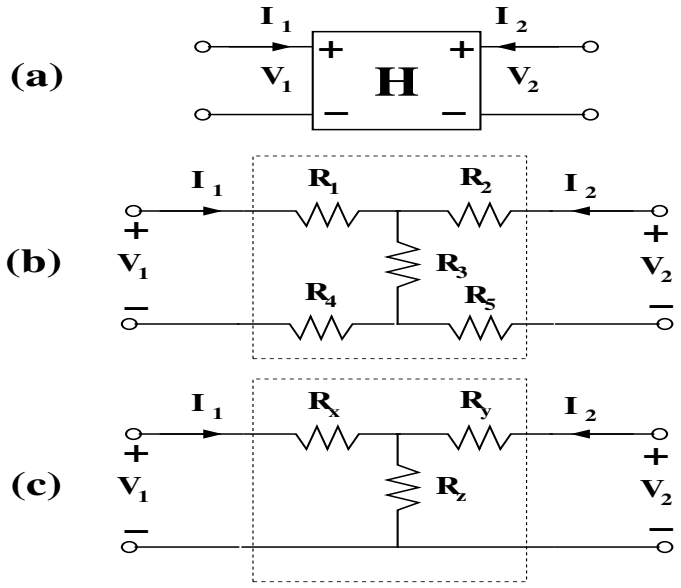

Figure 2: Circuit diagrams for problem 2

(a) *(1 pt)* What is H_{11} in terms of the resistance values in FIGURE 2(b).

$$H_{11} = R_1 + R_3 + R_4$$

(b) *(1 pt)* What is H_{22} in terms of the resistance values in FIGURE 2(b)?

$$H_{22} = R_2 + R_3 + R_5$$

(c) *(1 pt)* What are H_{12} and H_{21} in terms of the resistance values in FIGURE 2(b)?

$$H_{12} = H_{21} = R_3$$

(d) *(2 pts)* Please find values of R_x, R_y and R_z in FIGURE 2(c) in terms of R_n, $n = 1, ...5$ in FIGURE 2(b) that make the two circuits equivalent.

$R_z = R_3$**. *Then,***
$R_x + R_z = R_1 + R_3 + R_4$
so $R_x = R_1 + R_4$**.**
Also, $R_y + R_z = R_2 + R_3 + R_5$ ***so***
$R_y = R_2 + R_5$