PH 223 Week 6

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The first two problems are adapted from Grant Sherer. The final problem is adapted from Chapter 28 of the *Student Workbook* for *Physics for Scientists and Engineers*.

Activity 1

Three 45 Ω resistors are in parallel, connected to a 21 Ω resistor in series with a battery of potential difference 9 V.

(a) Draw a diagram of the circuit and a voltage diagram for at least one loop.

(b) Write loop and junction rules that completely characterize the circuit. (Use each resistor in at least 1 loop rule and 1 junction rule.)

(c) Find R_{eq}.

Activity 2

Sketch a circuit that uses any number of 12 Ω resistors to create an equivalent resistance of:

(a) 60 Ω

(b) 3 Ω

(c) 10 Ω

Activity 3

(a) Draw a circuit for which the Kirchhoff's loop law equation is

$$6\ \text{V} - I \cdot 2\ \Omega\ + 3\ \text{V} - I \cdot 4\ \Omega\ = 0.$$

Assume that the analysis is done in a clockwise direction.

(b) A voltage diagram is shown below for a different circuit. The current in the circuit is 2.0 A. Draw the circuit diagram and identify the points on the circuit diagram that are on the voltage diagram.