Example Problems – circuits with two resistors

1. In the circuit, resistor A is 20 Ω and the voltage of the source is 120 V.

The power consumption of resistor A is 80 W.

A

B

20 Ω

(a) What is the current through resistor A?

(b) What is the voltage across resistor A?

(c) What is the current produced by the source?

(d) What is the current through resistor B?

(e) What is the power output of the source?

(f) What is the voltage across resistor B?

(g) What is the resistance of resistor B?

2. In the circuit, resistor A is 3 Ω and resistor B is 6 Ω.

A

B

3 Ω

6 Ω

9 V

The source is a 9 V battery.

(a) What is the resistance of the circuit?

(b) What current is produced by the source?

(c) What is the current through resistor A?

(d) What is the current through resistor B?

(e) What is the voltage across resistor A?

(f) What is the voltage across resistor B?

3. In the circuit, resistor A is 20 Ω and

resistor B is 60 Ω. The source is a 12-volt

A

B

S

20 Ω

60 Ω

12 V

power supply. The switch in the circuit

is open.

(a) What is the voltage across resistor A?

(b) What is the voltage across resistor B?

(c) What is the current through resistor A?

(d) What is the current through resistor B?

(e) How much current does the power supply produce?

(f) What is the power output of the source?

(g) What is the resistance of the circuit?

The switch is now closed.

(h) What is the voltage across resistor A?

A

B

S

20 Ω

60 Ω

12 V

(i) What is the voltage across resistor B?

(j) What is the current through resistor A?

(k) What is the current through resistor B?

(l) How much current does the power supply produce?

(m) What is the power output of the source?

(n) What is the resistance of the circuit?

4. I have a 200 Ω resistor and a 6-V source. The power delivered to the resistor cannot

exceed 0.1 watt or the resistor will be damaged. The resistor will not work if the power delivered is less than 0.08 watt.

(a) Can I connect the resistor directly to the source and have it operate properly?

(b) To power the resistor with the source, should I add another resistor in series or

in parallel with the 200 Ω resistor before connecting to the source?

(c) What is the resistance range of the resistor I should add?

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(e) How much current does the power supply produce?

(f) What is the power output of the source?

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(h) What is the voltage across resistor A?

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S

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60 Ω

12 V

(i) What is the voltage across resistor B?

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