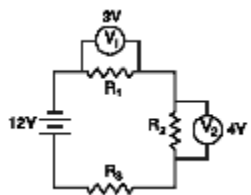


- 94 The diagram at right shows three resistors,  $R_1$ ,  $R_2$ , and  $R_3$ , connected to a 12-volt battery.

If voltmeter  $V_1$  reads 3 volts and voltmeter  $V_2$  reads 4 volts, what is the potential drop across resistor  $R_3$ ?

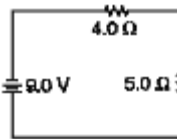
- (1) 12 V (2) 5 V  
(3) 0 V (4) 4 V



- 95 A 9.0-volt battery is connected to a 4.0-ohm resistor and a 5.0-ohm resistor as shown in the diagram below.

What is the current in the 5.0-ohm resistor?

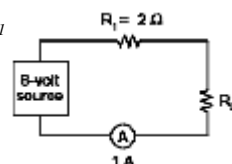
- (1) 1.0 A (2) 1.8 A (3) 2.3 A (4) 4.0 A



*Hint:* In a series circuit, current is the same in all parts of the circuit and is equal to the total current.

- 96 The circuit shown at right contains two resistors,  $R_1$  and  $R_2$ .

What is the resistance of resistor  $R_2$ ?



- 97 In the circuit shown at right, voltmeter  $V_2$  reads 80. volts. What is the reading of voltmeter  $V_1$ ?

- (1) 160. V (2) 80. V (3) 40. V (4) 20. V

- 98 In question 97, the circuit is

- (1) a series circuit with voltmeter in parallel  
(2) a series circuit with voltmeter in series  
(3) parallel circuit with voltmeter in parallel

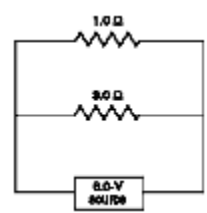
- 99 A 20.-ohm resistor and a 30.-ohm resistor are connected in parallel to a 12-volt battery as shown. An ammeter is connected as shown at right.

What is the equivalent resistance of the circuit?

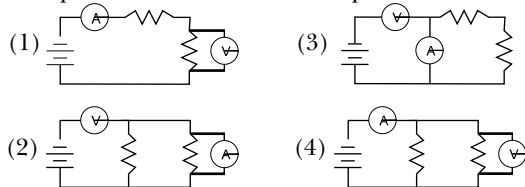
- (1) 10.  $\Omega$  (2) 12  $\Omega$  (3) 25  $\Omega$  (4) 50.  $\Omega$

- 100 The diagram at right shows two resistors connected in parallel across a 6.0-volt source. The equivalent resistance of the two resistors is

- (1) 0.75  $\Omega$  (2) 2.0  $\Omega$   
(3) 1.3  $\Omega$  (4) 4.0  $\Omega$



- 101 Which circuit shown below could be used to determine the total current and potential difference of a parallel circuit?



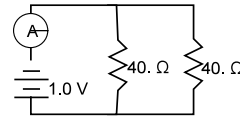
- 102 Which circuit diagram below correctly shows the connection of ammeter  $A$  and voltmeter  $V$  to measure the current through and potential difference across resistor  $R$ ?

106 A physics student is given three 12-ohm resistors with instructions to create the circuit that would have the lowest possible resistance. The correct circuit would be a

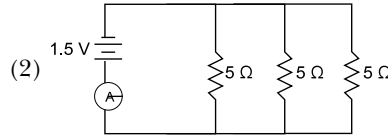
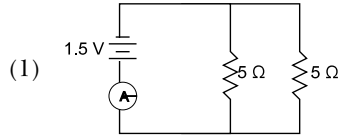
- (1) series circuit with a total resistance of  $36\ \Omega$
- (2) series circuit with a total resistance of  $4\ \Omega$
- (3) parallel circuit with a total resistance of  $36\ \Omega$
- (4) parallel circuit with a total resistance of  $4\ \Omega$

107 In the circuit diagram at right, ammeter  $A$  measures the current supplied by the 10.-volt battery. The current measured by the ammeter  $A$  is

- (1) 0.13 A
- (2) 2.0 A
- (3) 0.50 A
- (4) 4.0 A



Base your answers to questions 108 and 109 on the circuit drawings below.



108 Find the current in circuit 1 and in circuit 2.

109 By looking at the two circuits, how can you tell which circuit has more current?

110 An electric circuit contains an operating heating element and a lit lamp. Which statement best explains why the lamp remains lit when the heating element is removed from the circuit?

- (1) The lamp has less resistance than the heating element.
- (2) The lamp has more resistance than the heating element.
- (3) The lamp and heating element were connected in series.
- (4) The lamp and heating element were connected in parallel.

*Hint:* A heating element is a resistor, just like a bulb is a resistor.

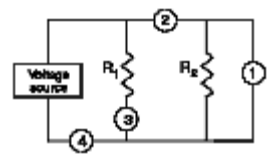
111 Four lamps are connected in parallel. If one lamp burns out, the current and brightness of the other lamps

- (1) increase
- (2) decrease
- (3) remain the same

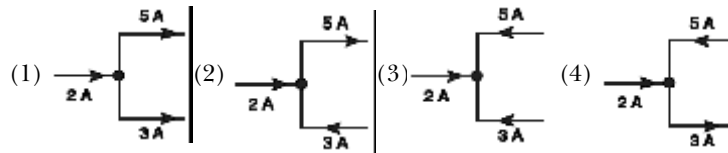
112 Two resistors are connected to a source of voltage as shown in the diagram at right.

At which position should an ammeter be placed to measure the current passing only through resistor  $R_1$ ?

- (1) 1
- (2) 2
- (3) 3
- (4) 4



113 Which diagram shows correct current direction in a segment of an electric circuit?



**CONSTRUCTED RESPONSE QUESTIONS: Parts B-2 and C of NYS Regents Exam**

- 158 In the space provided *on your answer paper*, draw a diagram of this circuit, using the symbols with labels given below. [Assume availability of any number of wires of negligible resistance.]



- 159 Determine the total resistance. [Show all calculations, including the equation and substitution with units.]
- 160 Determine the total circuit current. [Show all calculations, including the equation and substitution with units.]

Base your answers to questions 161-165 on the information and data table below.

Three lamps were connected in a circuit with a battery of constant potential. The current, potential difference, and resistance for each lamp are listed in the data table below. [There is negligible resistance in the wires and the battery.]

	Current (A)	Potential Difference (V)	Resistance ( $\Omega$ )
lamp 1	0.45	40.1	89
lamp 2	0.11	40.1	365
lamp 3	0.28	40.1	143

*Hint:* Use symbol for lamp given on **Reference Table: Circuit Symbols**.

- 161 Using the circuit symbols found in the *Reference Tables for Physical Setting/Physics*, draw a circuit showing how the lamps and battery are connected.
- 162 What is the potential difference supplied by the battery?
- 163 Calculate the equivalent resistance of the circuit. [Show all work, including the equation and substitution with units.]
- 164 If lamp 2 is removed from the circuit, what would be the value of the potential difference across lamp 1 after lamp 2 is removed?
- 165 If lamp 2 is removed from the circuit, what would be the value of the current in lamp 1 after lamp 2 is removed?

Base your answers to questions 166-168 on the information below.

You are given a 12-volt battery, ammeter  $A$ , voltmeter  $V$ , resistor  $R_1$ , and resistor  $R_2$ . Resistor  $R_2$  has a value of 3.0 ohms.

- 166 Using appropriate symbols from the *Reference Tables for Physical Setting/Physics*, draw and label a complete circuit showing:
- resistors  $R_1$  and  $R_2$  connected in parallel with the battery
  - the ammeter connected to measure the current through resistor  $R_1$ , only
  - the voltmeter connected to measure the potential drop across resistor  $R_1$