

Grade 9 Unit Practice Test

Science

Electrical Principles
and Technologies

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Use the following information to answer question 1.

Clothes that are removed from a clothes dryer are sometimes stuck together.

1. The example described above is most likely a result of
 - A. current electricity
 - B. a buildup of neutral atoms
 - C. an imbalance of electric charges
 - D. anti-static sheets absorbing neutral charges
-

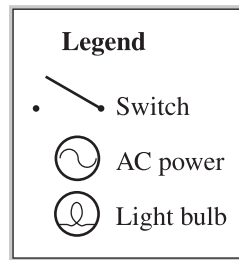
Use the following information to answer question 2.

Joe watches television for 6.00 hours (21 600 seconds). The input power rating of his television is 200 W.

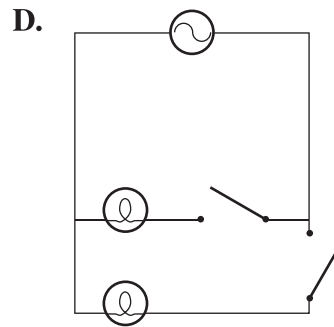
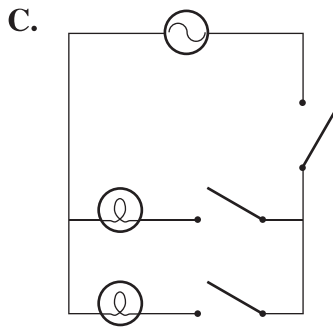
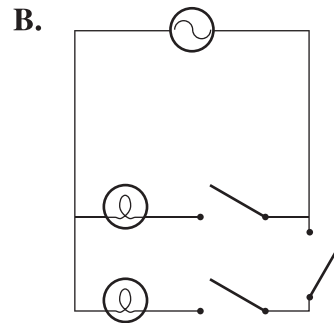
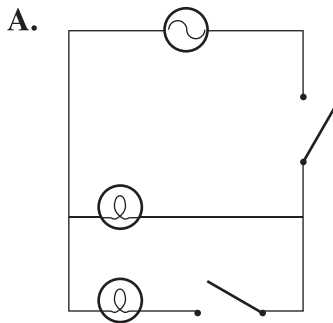
2. The total electrical energy consumed by the television during this time is
 - A. 33.3 J
 - B. 1 200 J
 - C. 129 600 J
 - D. 4 320 000 J

Use the following information to answer question 3.

A garage is equipped with two lights and a power source. Each light can be controlled separately, and there is a switch that can turn off both lights at once.



3. Which of the following diagrams represents the circuit described above?



Use the following information to answer question 4.

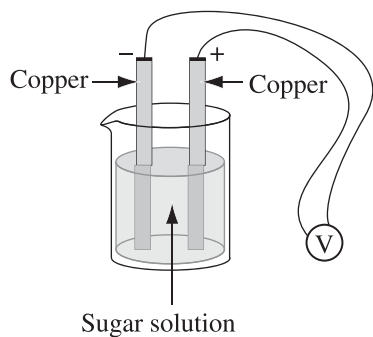
Regional Electrical Energy Generation (GW·h) by Resource, 1999–2002

Year	Coal	Natural Gas	Hydro	Wind	Biomass and Waste	Total
1999	40 276.7	12 126.2	1 453.3	183.1	255.2	54 294.5
2000	40 459.2	15 219.9	1 756.3	71.9	273.8	57 781.1
2001	41 713.3	18 792.9	1 675.4	323.2	282.3	62 787.1
2002	42 541.8	19 462.1	2 188.2	64.6	335.5	64 592.2

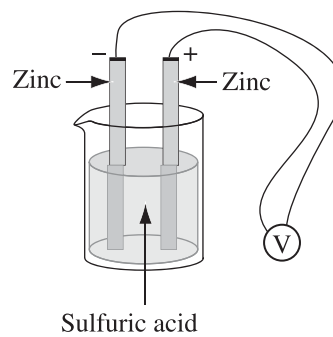
4. Which of the following statements is supported by the data in the table above?
- A. The combined production of energy from renewable and non-renewable resources decreases yearly.
 - B. The combined production of energy from renewable and non-renewable resources increases yearly.
 - C. As the generation of electrical energy from non-renewable resources increases, the generation of electrical energy from renewable resources decreases.
 - D. As the generation of electrical energy from renewable resources increases, the generation of electrical energy from non-renewable resources decreases.

5. Which of the following electrochemical cells would produce the **highest** voltage?

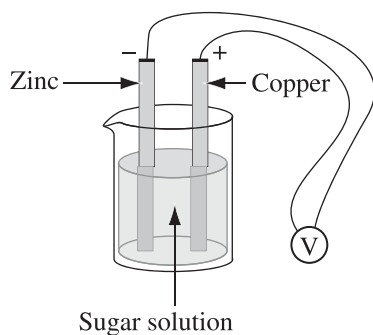
A.



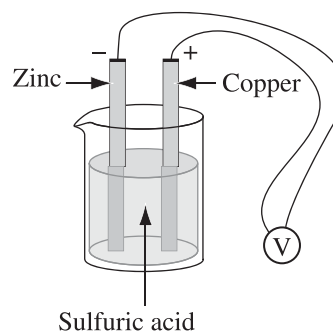
B.



C.



D.



Use the following information to answer numerical-response question 1.

In order to produce 100 000 J of heat energy, a hot plate consumes 800 000 J of electrical energy.

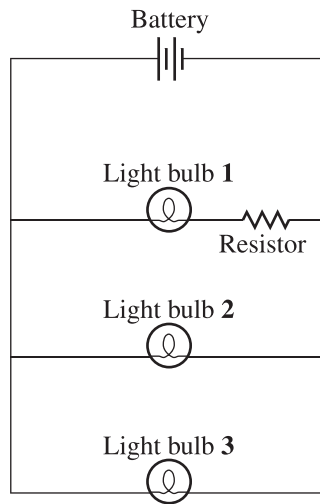
Numerical Response

1. The efficiency of the hot plate is _____ %.

(Record your answer.)

Use the following information to answer question 6.

Circuit with Three Identical Light Bulbs



6. Which of the following statements predicts the relative brightness of each of the three light bulbs in the circuit shown above?
- A. Light bulb 1 is brighter than Light bulb 2, which is brighter than Light bulb 3.
 - B. Light bulb 1 is dimmer than Light bulb 2, which is dimmer than Light bulb 3.
 - C. Light bulb 1 is brighter than light bulbs 2 and 3, which both have the same brightness.
 - D. Light bulb 1 is dimmer than light bulbs 2 and 3, which both have the same brightness.

Use the following information to answer question 7.

Information About a Circuit

- Contains one light bulb
- Draws a current of 3.0 A
- Has two wires
- Connects to a 6.0 V battery

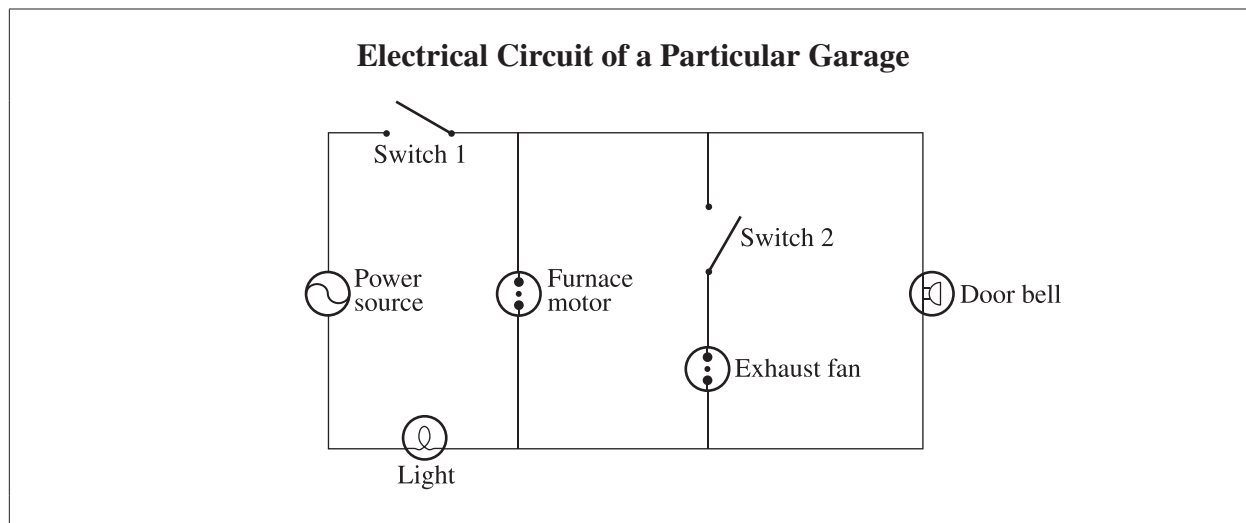
7. The resistance of the circuit described above is

- A. 2.0 Ω
 - B. 3.0 Ω
 - C. 4.0 Ω
 - D. 6.0 Ω
-

8. Tungsten, a poor conductor, is used as a filament in some light bulbs because tungsten

- A. allows electrons to flow easily
- B. allows protons to flow easily
- C. resists the flow of electrons
- D. resists the flow of protons

Use the following diagram to answer question 9.



9. Which components in the circuit will be turned on when Switch 1 is closed?
- A. The furnace motor, the light bulb, and the exhaust fan only
 - B. The furnace motor, the light bulb, and the doorbell only
 - C. The light bulb and the exhaust fan only
 - D. The light bulb and the doorbell only

Use the following information to answer question 10.

Examples of Electricity

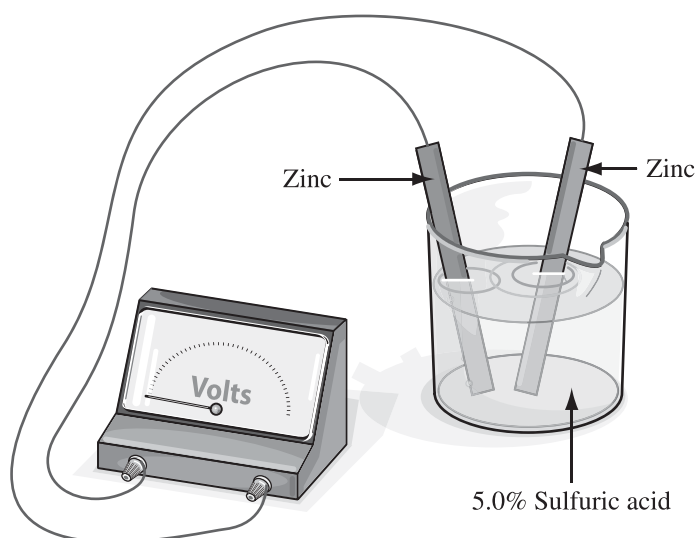
- I Rubbing a balloon with wool will make the balloon stick to a wall.
- II Connecting a battery in a circuit can turn a light bulb on.
- III Plugging a cellphone into an electrical outlet will charge the phone.
- IV Using conditioner can help prevent the buildup of electric charges in hair.

10. The examples that describe static electricity are

- A. I and III
- B. I and IV
- C. II and III
- D. II and IV

Use the following information to answer question 11.

After assembling the electrical storage cell shown below, Ali noticed that no electricity was produced.



11. Which change could Ali make to the electrical storage cell to produce electricity?
- A. Replace one of the zinc electrodes with copper.
 - B. Increase the sulfuric acid concentration to 7.5%.
 - C. Replace both of the zinc electrodes with copper.
 - D. Decrease the sulfuric acid concentration to 2.5%.
-
12. Which of the following conditions of a circuit would be expected to cause the light bulbs to shine the brightest?
- A. The presence of a resistor and 2 light bulbs
 - B. The presence of a resistor and 3 light bulbs
 - C. No resistor and 2 light bulbs
 - D. No resistor and 3 light bulbs

Use the following information to answer question 13.

A student explains how electric circuits function by comparing them to a traffic model. Some of the components of traffic are listed below.

Traffic Components

- I** Speed limit signs
- II** Traffic lights
- III** Vehicles
- IV** Roads

13. Which component of the traffic model **most closely** resembles the function of switches in circuits?
- A. I
 - B. II
 - C. III
 - D. IV
-

14. Which of the following sources of energy is classified as renewable?
- A. Natural gas
 - B. Biomass
 - C. Coal
 - D. Oil

Use the following information to answer numerical-response question 2 and question 15.

Kelly recorded the input energy and output energy of four electrical devices.

Device	Input Energy (J)	Output Energy (J)
1	10	3
2	71	16
3	100	27
4	950	510

Numerical Response

2. When listed in order from the **most** efficient device to the **least** efficient device, the order is

_____ , _____ , _____ , and _____ .

**Most
efficient**

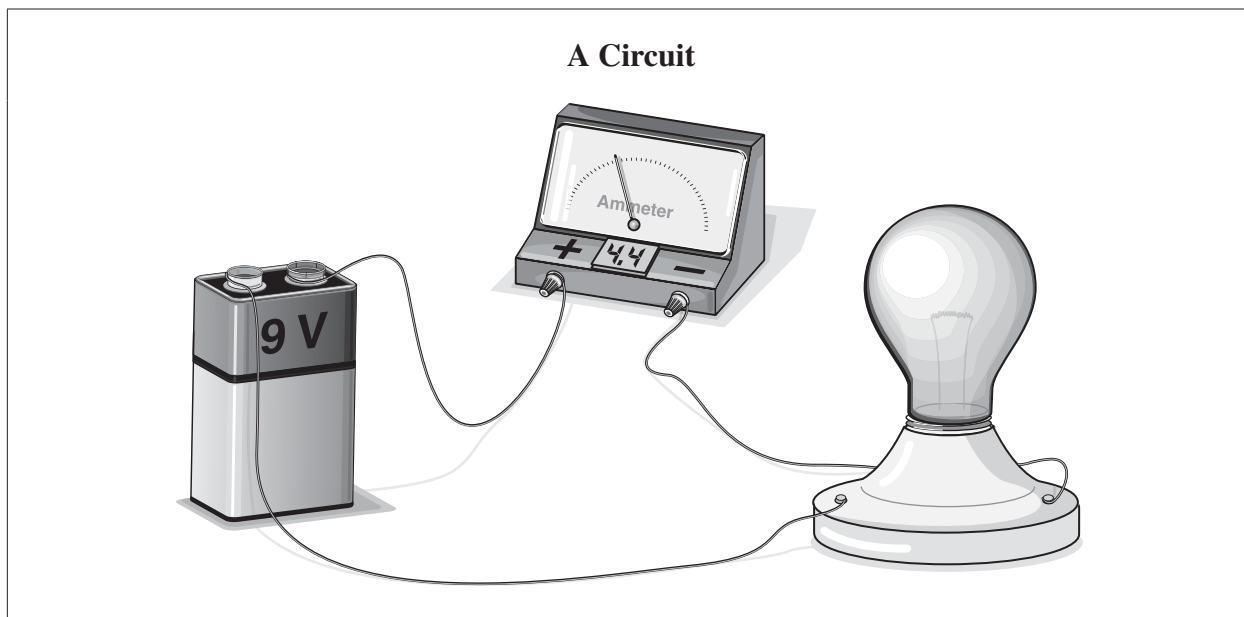
**Least
efficient**

(Record all **four digits** of your answer.)

15. The manipulated variable in the investigation above is the

- A. time
- B. efficiency
- C. output energy
- D. type of device

Use the following information to answer question 16.



16. What is the power output of the light bulb?
- A. 0.500 W
 - B. 2.00 W
 - C. 13.4 W
 - D. 39.6 W
-
17. Which of the following statements describes a disadvantage of coal-fired electricity generation?
- A. Emits pollutants into the atmosphere
 - B. Disrupts the natural flow of waterways
 - C. Provides an unreliable method for producing energy
 - D. Produces hazardous waste that requires long-term storage
18. An electrical device with low efficiency is **most likely** producing waste
- A. light energy
 - B. thermal energy
 - C. electrical energy
 - D. mechanical energy

Science 9 – Practice Test 2019

Electrical Principles and Technologies Key

Question # in Document	Key
1	C
2	D
3	C
4	B
5	D
NR1	12.5
6	D
7	A
8	C
9	B
10	B
11	A
12	C
13	B
14	B
NR2	4132
15	D
16	D
17	A
18	B