

Name Key

1. If an object is repelled by a negatively charged substance, the object has/is

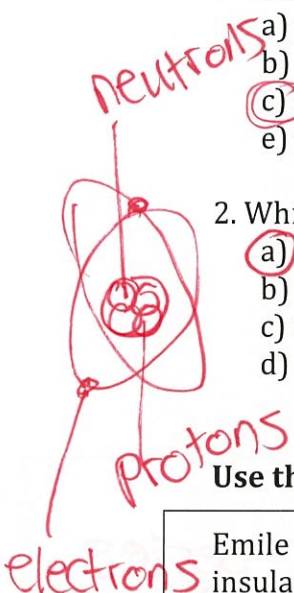
- a) positive charge
- b) neutral
- c) negative charge
- e) impossible to say what charge is on the object

Law of charges

• opposites attract
• Similar repel
• Neutral attract charged

2. Which statement correctly describes an atom?

- a) electrons orbit around the protons and neutrons
- b) protons orbit around the electrons and neutrons
- c) neutrons orbit around the protons and electrons
- d) electrons, neutrons and protons are mixed together

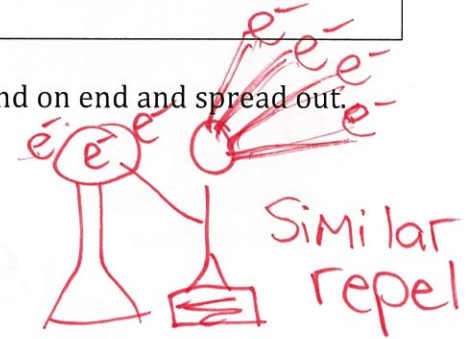


Use the following information to answer questions 3 and 4.

Emile tries an experiment with a Van de Graaff generator (VDG). He stands on an insulating platform, with one hand on the metal sphere of the VDG. The VDG is turned on. A minute later, Emile reaches out to touch Leslie, another student standing nearby. As Emile's finger approaches Leslie, both students feel a sudden, painful shock.

3. As Emile stood touching the VDG, his hair began to stand on end and spread out. This was most likely due to

- (a) his hair strands being attracted to the VDG
- (b) his hair strands being repelled by the VDG
- (c) his hair strands being attracted to each other
- (d) his hair strands being repelled by each other

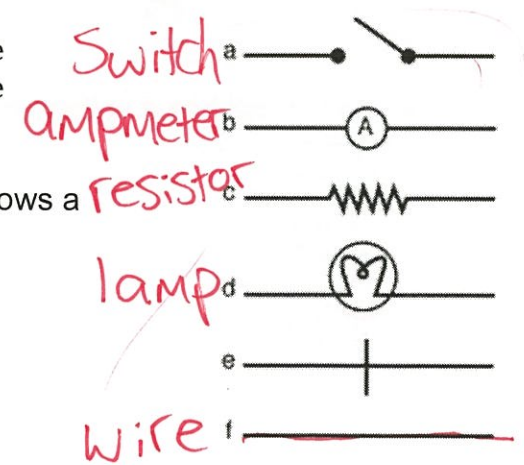


4. The painful shock felt by the students was most likely due to

- (a) a static discharge from Emile to Leslie
- (b) a static discharge from Leslie to Emile
- (c) a static transfer of protons from Emile to Leslie
- (d) a static transfer of protons from Leslie to Emile

5. In the diagram to the right, which circuit symbol shows a resistor?

- a) A
- b) B
- c) C
- d) D



Electricity- Unit exam review

6. The amount of current flowing through a circuit is measured in:

- a) volts
- b) watts
- c) ohms
- d) amps
- e) electrons

Current (I)
AMPS

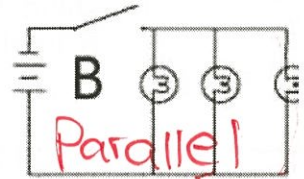
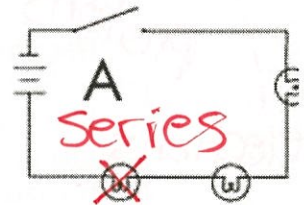
7. What type of meter measures only potential difference?

- a) voltmeter
- b) ammeter
- c) galvanometer
- d) multimeter
- e) ohmmeter

aka Voltage

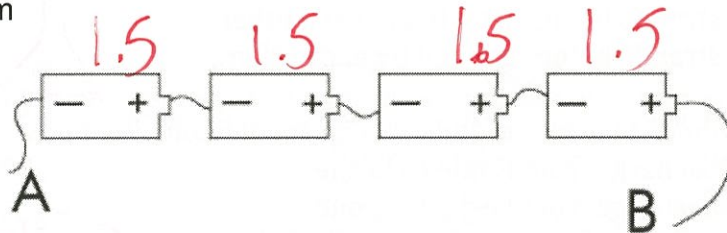
8. Examine the following statements concerning the circuits shown to the right:

- I. Circuit A is a parallel circuit
- II. Circuit B is a series circuit
- III. Disconnecting one bulb in A will force all light bulbs to go dark
- IV. If the battery in B has a potential difference of 9 volts, all bulbs also have a potential difference of 9 volts.



Which of the following are true?

- a) I only
- b) III, IV only
- c) I, II only
- d) None of them
- e) All of them



9. If each cell has a voltage of 1.5 volts, the voltage between A and B is _____ volts

- a) 1.5
- b) 3.0
- c) 4.5
- d) 6.0
- e) 9.0

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10. When a fuse burns out in your home it means:

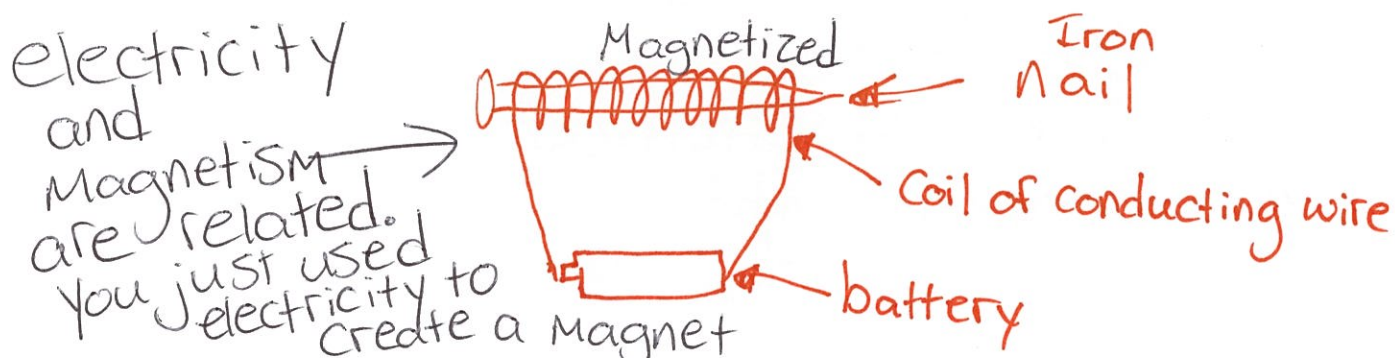
- a) too much current is flowing in the circuit
- b) not enough current is flowing in the circuit.
- c) a power failure occurred
- d) more than two loads have been connected to a circuit.
- e) the fuse was incorrectly placed in the fuse box.

11. Christmas lights are wired so that if one bulb "dies", the other bulbs will remain lit. These lights are connected in _____.

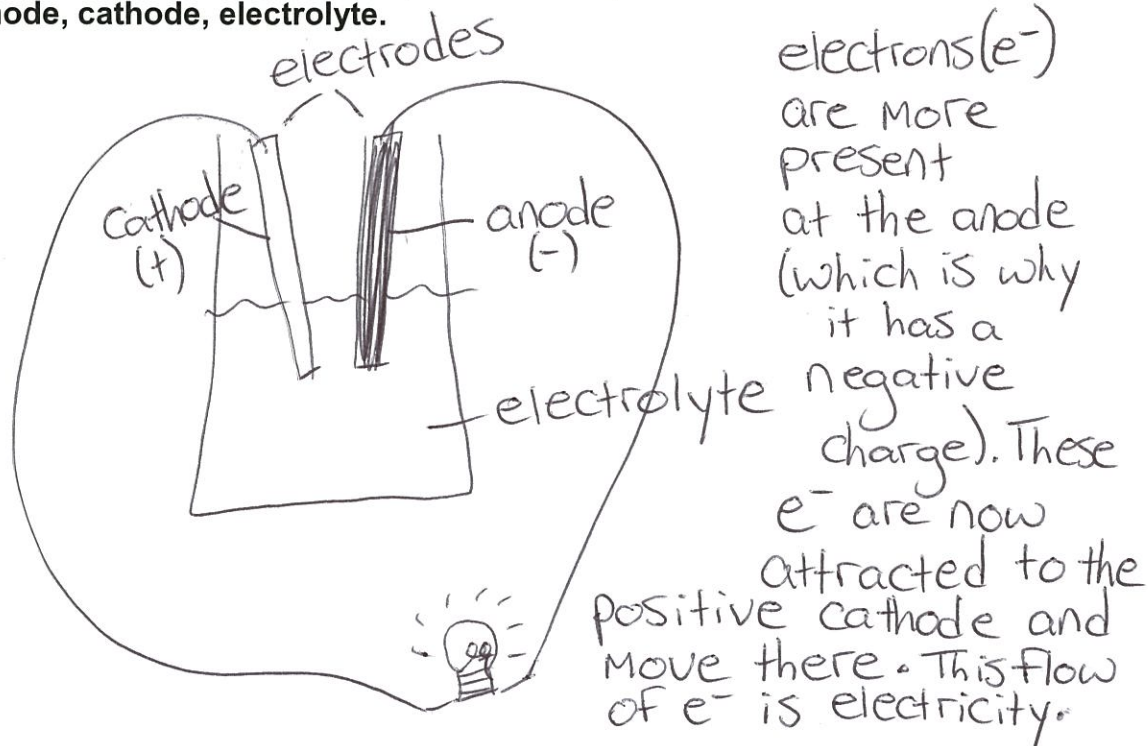
- a) superposition
- b) tandem
- c) conjunction
- d) series
- e) parallel

WRITTEN:

1) Draw what an electromagnet looks like (lab in topic 6). Label the parts.



2) Draw an electrochemical cell (a wet cell) and label its parts. **Include words: electrode, anode, cathode, electrolyte.**



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3) Topic 5

Electrode- definition	Electrolyte-definition
2 different Metals. Cathode (+) Anode anode (-)	A liquid (wet cell) or paste (dry cell) that is salty or acidic.

4) Looking at the types of energy in topic 4 (that we discussed), tell me the input and output energy conversions for each of these devices.

Input Energy Output
 Chemical → Battery → electrical
 Mechanical → Generator → electrical
 electrical → Motor → Mechanical
 Thermal → Thermocouple → electrical
 electrical → light bulb → light

** Bonus: What type of energy is most of the input energy lost as in a lightbulb?

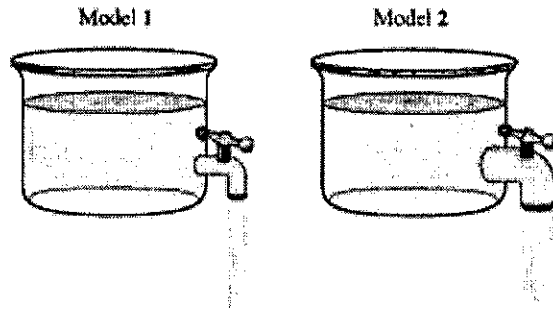
Most energy is lost as heat.
 * Nothing is 100% efficient

5) Topic 1

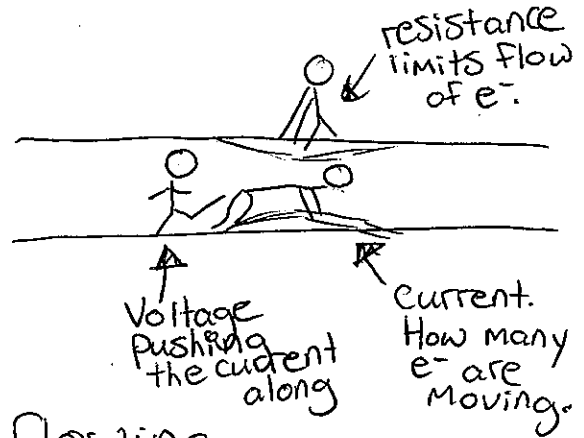
Insulators- definition and examples	Conductors- definition and examples
Does not allow e^- to flow on them. ex) rubber, glass	Allows e^- to flow on them. ex) metal,

6) Water models that represent current, voltage, and resistance in electrical currents.

Models That Represent Current, Voltage, and Resistance in Two Electrical Circuits



★ Remember this little cartoon



Explain what each part relates to in the water model:

Current: Amount of electrons flowing.

→ Amount of water flowing through spout.

Voltage: Pressure the electrons are under.

→ force of gravity pulling H₂O down

Resistance: Slowing the flow of e⁻ in a circuit.

→ Diameter of the spout

7) Using Ohm's Law, calculate how much current is created when 210V creates a current through a 150 ohm resistor.



$$R = \frac{V}{I}$$

$$V = 210V$$

$$I = ?$$

$$R = 150\Omega$$

$$I = \frac{V}{R}$$

$$I = 1.4A$$

8) Topic 3- resistance. What type of filament in a lightbulb would offer the most resistance?

- a) short, thick wire
- b) long, thick wire
- c) long, thin wire
- d) short, thin wire

Think → what is harder for e⁻ to move through?

Electricity- Unit exam review

9. An electric motor has a resistance of 185Ω . It is connected to a power source that has a voltage of 120 V . Calculate the current that flows through the motor.



$$R = 185 \Omega \quad I = \frac{V}{R} = \frac{120}{185}$$

$$V = 120 \text{ V}$$

$$I = ?$$

$$I = 0.65 \text{ A}$$

(/2 marks)

Final Answer: 0.65 A

10. An electric appliance draws 1200 W of power. Electricity costs 9 cents per kWh. How much does it cost to operate the appliance 4 hours a day for 50 days? *hint - it says kWh so I must find that first.*

$$P = 1200 \text{ W} \xrightarrow{\text{convert}} 1.2 \text{ kW} \quad t = 4 \text{ h} \times 50 \text{ d} \rightarrow 200 \text{ hr} \quad \times \quad 240 \text{ kWh}$$

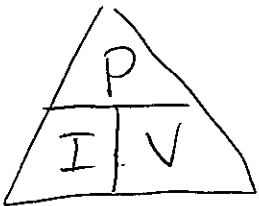
KHD (W) dcm

(/2 marks)

$$\$0.09 \text{ (per kWh)} \times 240 \text{ kWh} = \$21.60$$

Final Answer: $\$21.60$

11. A light bulb draw 1.5 A of current from a 110 V generator. How much power does the generator produce?



$$I = 1.5 \text{ A}$$

$$V = 110 \text{ V}$$

$$P = ? \text{ W}$$

(/2 marks)

Final Answer: 165 W

$$P = I \times V$$

$$1.5 \text{ A} \times 110 \text{ V}$$

$$P = 165 \text{ W}$$

12

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

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

$$\frac{3}{10} \times 100 = 30\%$$

$$\frac{16}{71} \times 100 = 22.5\%$$

$$\frac{27}{100} \times 100 = 27\%$$

$$\frac{510}{950} \times 100 = 53.7\%$$

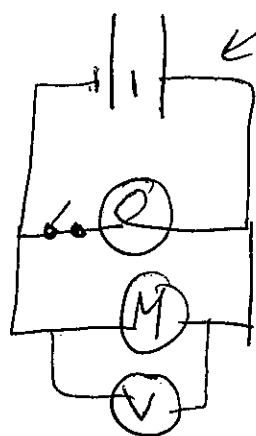
When listed in order from the most efficient device to the least efficient device, the order is

4, ~~1~~ 3, and 2.

Most efficient Least efficient

$$\text{efficiency} = \frac{\text{output}}{\text{input}} \times 100\% \quad (12 \text{ marks})$$

13. Draw, using proper symbols, a circuit containing a battery of 2 cells connected to a lamp and a motor in parallel. Add a switch to control the lamp **only** and a voltmeter to measure the potential difference across the motor.



← battery of 2 cells = 3V
(every cell is 1.5V)

(12 marks)

← Voltmeters must be placed with wires on either side of the load.

Electricity- Unit exam review

14) Define the following terms, and say what do we use them for:

Variable resistor: Can control (vary!) the resistance.

ex) dimmer switch.

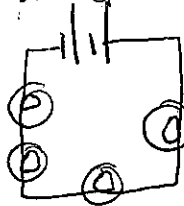
Circuit Breaker: Safety device that will open the circuit (break metal-to-metal contact) and turn off the electricity.

Too many volts or amps flowing into a house

battery is more than 1 cell

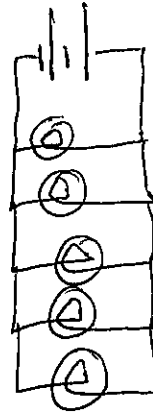
15) Draw out the following circuits: Then tell which will have the dimmest light/ and the brightest?

a) 1 battery, 4 lights in series



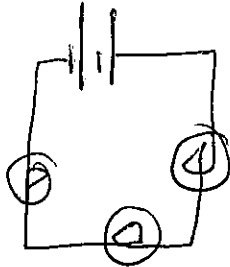
Dimmest

b) 1 battery, 5 lights in parallel



Brightest

c) 1 battery, 3 lights in series



16) A light bulb is only 4% efficient in producing light. If 800J of INPUT energy went into producing light, what is the output energy the bulb is capable of?

800J $800J \times 0.04 = 32J \text{ output}$

Electricity- Unit exam review

17) Describe each of the following types of power generation:

Coal-fired: Burning fossil fuels for power.
→ produces toxic ~~smoke~~ fumes.

Hydroelectric: Using water currents to create electricity. → disturbs natural water environment

Nuclear: Splitting or combining atoms
releasing bursts of energy → radioactive

Solar: Using Sun's energy to produce electricity. → Cannot collect on cloudy days.

Geothermal: Using heated steam from deep in the earth to produce electricity.

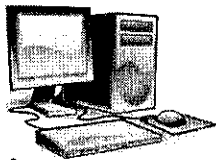
18) To calculate how efficient a device is, you calculate it like a test score. Take what you get, and divide by what it was out of, multiplied by 100.

$$\text{Ex) } \frac{\text{Output energy}}{\text{Input energy}} \times 100 = \text{efficiency of device in percentage}$$

(remember all things lose energy as heat.)

Calculate the efficiency of the following devices:

Input = 71J
Output = 11J



Computer is

$$\frac{11\text{J}}{71\text{J}} \times 100\%$$

15.5%
efficient

Input = 100J
Output = 34J



$$\frac{34}{100} \times 100$$

Fridge is
34% efficient

