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| NAME: | SCIENCE TEACHER: | 10B |
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SCIENCE

YEAR 10 EXAMINATION 2005

Total time allowed for both examinations: 2 hours

(80 marks)

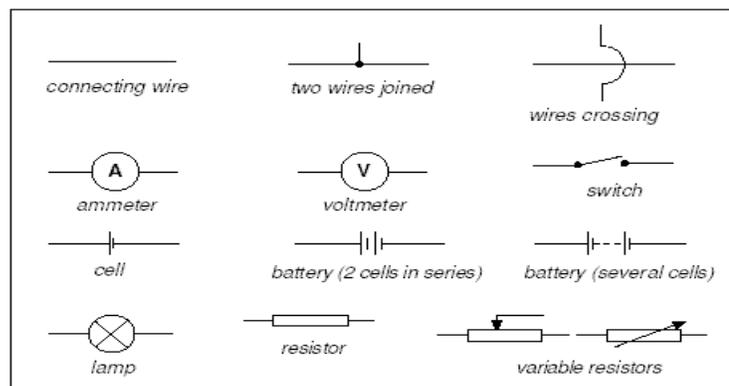
Answer all questions in the spaces provided on the paper.

You may use a calculator.

Show all your working, marks are awarded for it.

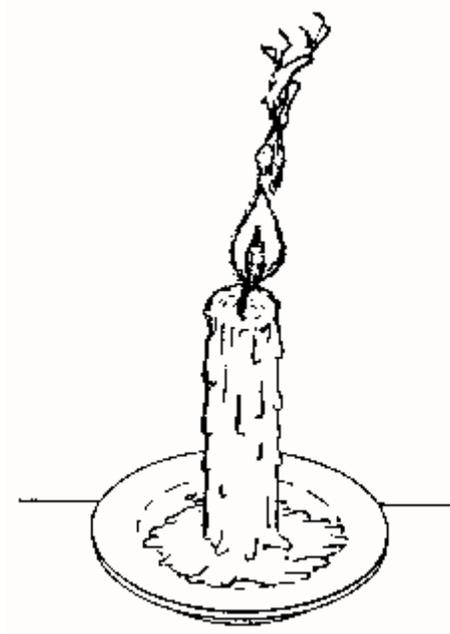
Give the units for all answers (e.g. kg or metres) unless they are already provided.

STANDARD CIRCUIT SYMBOLS



| | | | | | | | | | | | | | | | | | | | |
|------------------|----------|----------|----------|----------|----------|----------|----------|----------|----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|--------------|------------|
| Question. | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | Total | |
| Mark | | | | | | | | | | | | | | | | | | | /80 |

Question 1:



Cory and Ben were watching a candle burn and saw wax dripping onto a saucer. They both had different ideas about what was happening to the wax.

Cory said that "the wax was actually being burnt up because the candle was getting smaller".

Ben said that "the wax was not burning up but was just melting because there was wax on the saucer".

- a. What simple experiment could you do to find out whether Cory or Ben's explanation was correct? (Write a brief method of how you could do this experiment.)

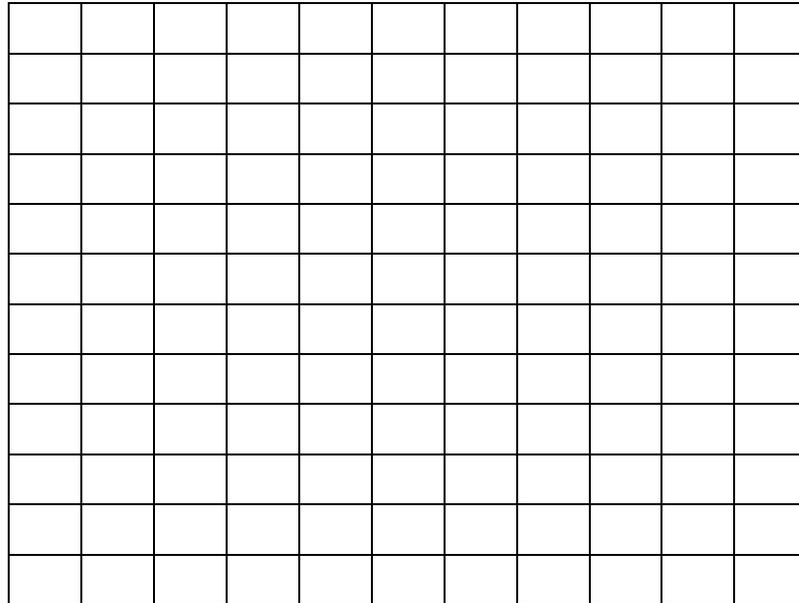
- b. What result would you expect if Cory's statement was correct?

Question 2:

The table below gives the temperatures recorded at different depths (as a change from the surface temperature) in a section of the Earth's crust.

| | | | | | | | | | |
|-------------------------|---|----|----|----|----|-----|---|-----|-----|
| Depth (km) | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
| Temperature (°C) | 0 | 20 | 45 | 70 | 95 | 120 | ? | 170 | 195 |

a. Plot this data as a line graph



b. From the graph, what is the temperature at a depth of 6 km? _____ °C

c. An underground coal mine is being developed in this area. If the miners could work in temperatures of 30°C or less, what is the maximum depth this coal mine could be? _____ km

d. Calculate the average temperature change for each kilometer change in depth.
_____ °C

e. Write a sentence explaining how the relationship between temperature and depth changes as the depth increases.

Question 3:

Hypothesis: The more salt there is in the water, the faster a nail will rust.

An experiment was set up to test this hypothesis.

a. What is the variable will you alter in this experiment?

b. What four factors that must be kept the same in this experiment.

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Question 4.

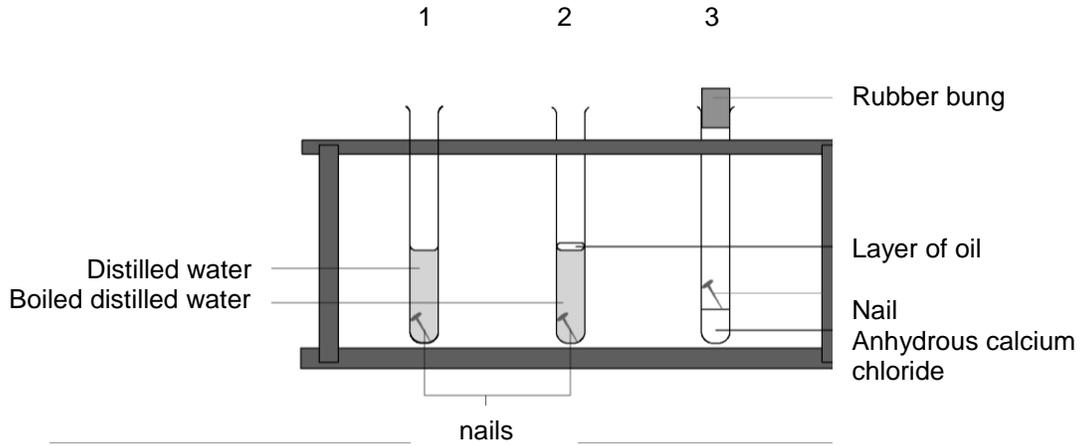
Below are some changes that can happen during cooking. Classify each as a **chemical** or **physical** change.

| Description | Chemical or Physical Change. |
|---------------------------------|------------------------------|
| • Stirring milk into hot coffee | |
| Melting butter | |
| Breaking eggs | |
| Baking biscuits | |
| Hard boiling an egg | |

b. What is the difference between chemical and physical change?

Question 5

Use the following information to help you answer the questions below.



a. Explain why the water is boiled and cooled and then oil is added in tube 2.

b. What does the anhydrous calcium chloride in tube 3 do?

c. What conditions are required for rust to form?

d. Give TWO ways of preventing rusting **and** for each method explain how it prevents rusting.

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Explanation:

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Explanation:

Question 6

Read the following descriptions of chemical reactions. Then write a **word equation** for each one. Use an arrow to indicate a chemical reaction taking place.



- a. Adding ethanoic acid solution (vinegar) to some sodium bicarbonate powder causes a fizz. A gas (carbon dioxide), water and sodium ethanoate are formed.

- b. Burning methane gas in air (oxygen) produces a colourless gas called carbon dioxide and water.

Question 7

Jack used universal indicator to find the pH of some common substances. These are his results.

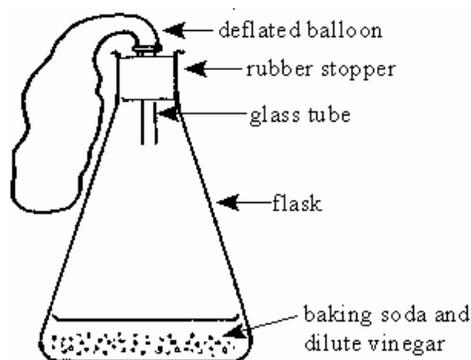
| Substance | pH |
|-------------------|-----|
| battery acid | 2 |
| blood | 7.5 |
| dishwasher powder | 11 |
| distilled water | 7 |
| lemon juice | 3 |
| oven cleaner | 10 |
| rain water | 6.5 |
| salt water | 7 |
| baking soda | 8 |

- a. Which chemicals are classified as bases?

- b. If you get stung by a bee (formic acid) which of the above substances could you place on the sting to reduce the effect of the acid?

- c. What do the chemicals named in part b. do?

Question 8



Baking soda (a carbonate) was placed in a flask and covered with dilute vinegar. The flask was then sealed with a rubber stopper fitted with a glass tube with a rubber balloon stretched over the top. The balloon began to inflate.

- a. What was the **physical** reason for the balloon inflating? Circle correct answer
- A The air in the flask expanded because of a decrease in pressure outside the flask.
 - B The water used to dilute the vinegar displaced the air trapped in the flask.
 - C Heat was created by the chemical reaction in the flask.
 - D Pressure inside the flask increased.
- b. Why were baking soda and vinegar used in this experiment? Circle correct answer.
- A The density of vinegar and baking soda means that more air in the flask is displaced.
 - B A gas is a product of the chemical reaction between baking soda and vinegar.
 - D When vinegar and baking soda are mixed, a change occurs which creates intense heat.
 - E Vinegar is an acid which gives off fumes which expand rapidly in a confined space.

c. After one minute the stopper was removed and a glowing taper put into the flask. What would Most likely happen? Circle the correct answer.

- A The taper would go out very soon.
- B Brown smoke would be produced.
- C There would be an explosion in the flask.
- D The taper would burst into flame.

d. In the space below draw a scientific diagram to show how you would make and collect hydrogen gas.

Remember to name all reactants and label all the equipment.



e. List three things that Hydrogen gas can be used for.

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| • |
| • |

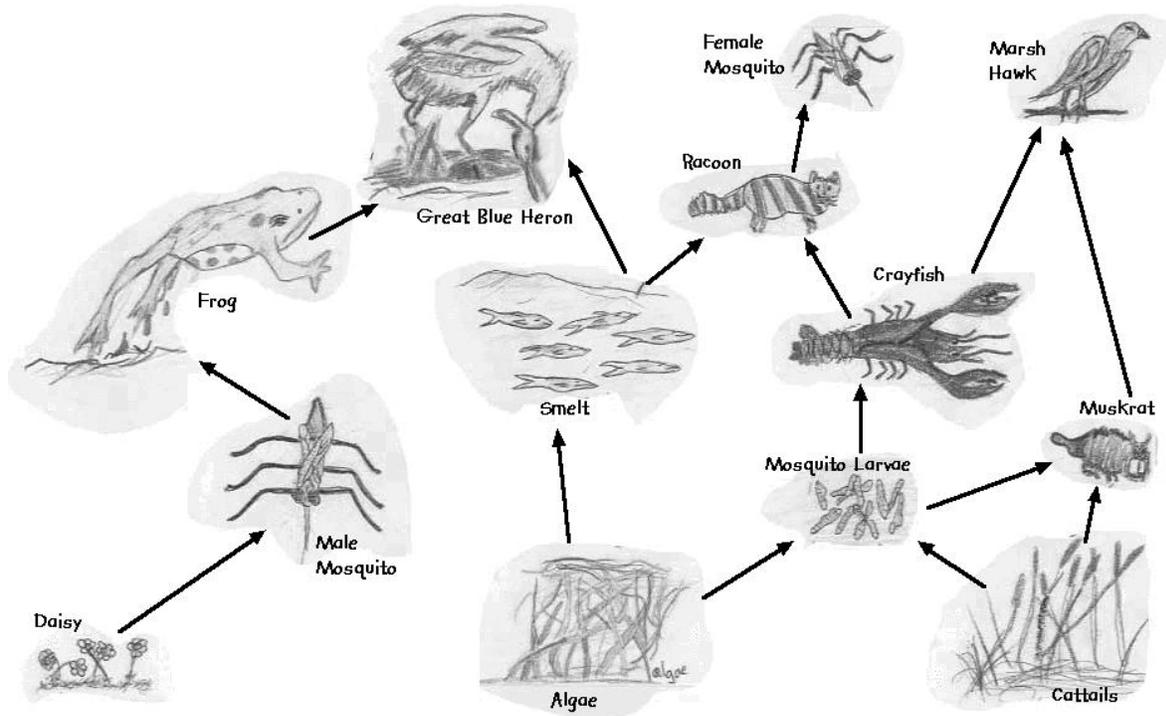
Question 9

| | |
|---|---|
|  | <p>Penguins living in the Antarctic have adaptations that help them survive.</p> <p>Complete the table below by explaining how each adaptive feature helps the penguin survive.</p> <p>The first one has been done for you.</p> |
|---|---|

| Adaptive Feature | | How it helps the penguin survive |
|------------------|--|---|
| 1 | Claws for gripping ice | Helps penguins get out of water onto the ice. |
| 2 | Eyes designed to focus under water | |
| 3 | Layer of blubber | |
| 4 | Streamlined body and strong, powerful tail | |

Question 10

Use the following food web to answer the following questions.



a. Name TWO producers in the food web. _____

b. What do the arrows on a food web represent?

c. What does the Marsh Hawk eat? _____

d. Draw a food chain which contains 5 organisms.

Question 11

Classify the following examples of energies below as either

- potential energy (stored energy)
- kinetic energy (object movement)
- radiant energy (wave or particle movement)

| Example of Energy | Type of energy |
|---|----------------|
| a) Energy of a moving car. | |
| b) Energy of electrons in a current carrying wire. | |
| c) Energy given out by a hot black can. | |
| d) Energy of a stretched piece of elastic. | |
| e) Energy of an apple. | |
| f) Energy of an object before it falls off a cliff. | |
| g) Energy of an object during its fall. | |

Question 12

| Everyday Objects | | |
|--|----------------------|-----------------------------|
| Hand-turned egg beater Battery charger Battery clock with moving hands | Torch Wind-up toy | Digital watch Hair dryer |

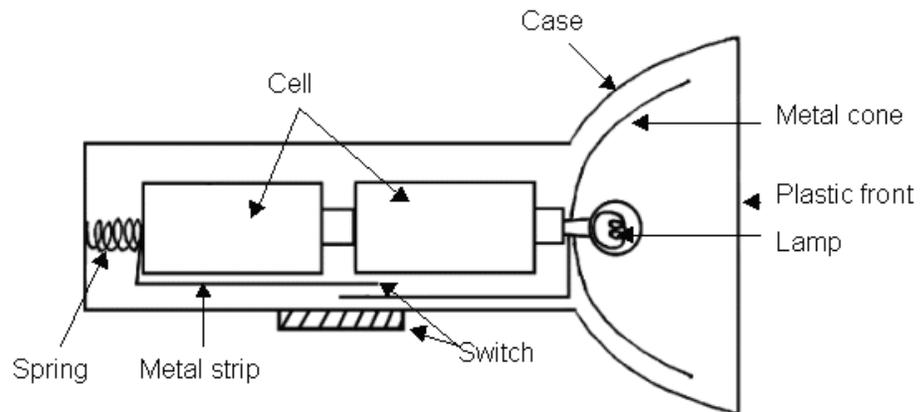
Match the name of the everyday object above with the main energy transformation occurring in each object. There is one extra object.

| Energy transformation | | Everyday object |
|-----------------------|---|-----------------|
| a) | Elastic potential energy → kinetic energy | |
| b) | Chemical energy → radiant energy | |
| c) | Electrical energy → chemical potential energy | |
| d) | Mechanical energy → kinetic energy | |
| e) | Chemical energy → kinetic energy | |
| f) | Chemical energy → light energy | |



Question 14

The diagram below represents a torch.

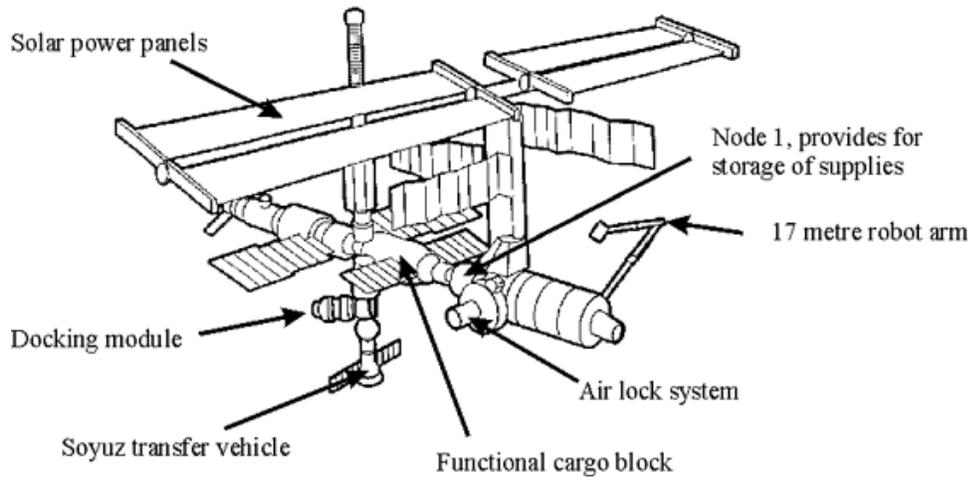


a. Complete the table by explaining the function of the different parts of the torch.

| PART | FUNCTION |
|-------------|----------|
| Cell | |
| Metal cone | |
| Metal strip | |
| Spring | |
| Switch | |

b. Using standard symbols, draw a circuit diagram to show how this torch works.

Question 15



In a joint space programme between the USA and Russia an International Space Station is to be built. The station will be built in sections beginning with the functional cargo block. This will provide control, propulsion, and power during the early stages of building.

Use the diagram and your own knowledge to answer the following questions.

a. i) What energy source will be used by this space station? (circle one)

- (A) Nuclear (B) Wind (C) Sun (D) Cosmic Rays

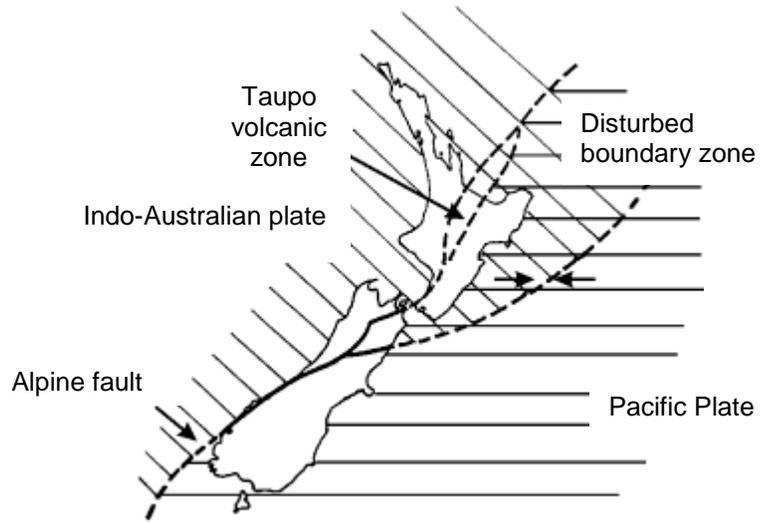
ii) Explain why you chose your answer above.

b. Give two examples of supplies that would be stored in Node 1 for the crew of the space station.

c. Why would using the 17 meter robot arm make it safer for the crew?

d. One of the last features to be added is an air lock system. Why is an air lock system needed if astronauts are to carry out space walks?

Question 16



Focus of earthquakes

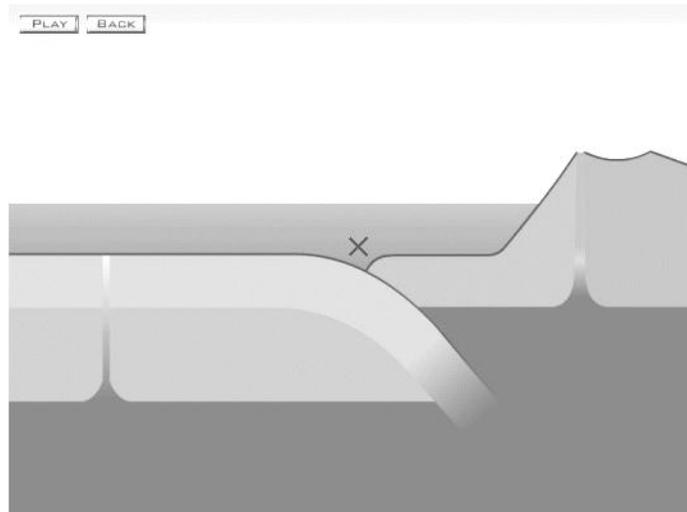
Earth's plates and New Zealand

a. What relationship is there between the focus of the earthquakes and the position of the plates?

b. From the maps give two pieces of evidence which show that New Zealand is a geologically active country.



Question 17



a. i) Draw an "S" on the diagram above to show where the Earth's plates are moving apart.

ii) Explain what causes the plates to move apart.

b. i) Draw an 'E' on the map to indicate an area that would have a higher number of earthquakes.

ii) Explain why this area would have a higher number of earthquakes?

c. What feature would be at point 'X'? _____

d. On the diagram label an area of oceanic crust and an area of continental crust.

f. On the diagram draw a 'Y' to show where the youngest rocks could be found.

g. New Zealand has more earthquakes than Australia. Explain why this statement is true.
