

NAME:	SCIENCE TEACHER:	<b>10B</b>
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# SCIENCE

## Year 10 Examination 2007

**10B – 80 marks**

**Make sure that you have answered all the questions in this paper before you start paper 10A or 10C**

***Time allowed for both examinations: 2 hours***

Answer all questions in the spaces provided on the paper.

You may use a calculator.

Show all your working in calculations; marks are awarded for it.

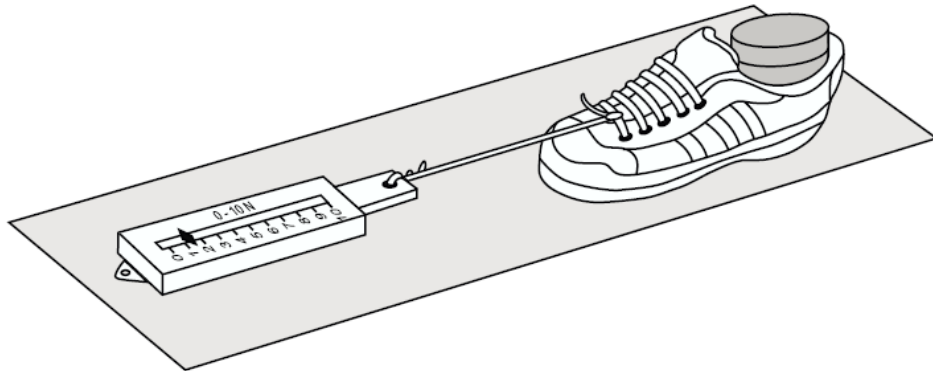
Give units for all answers (eg kg or m) unless they are already provided.

*For Teacher Use*

Question	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	Total
Marks gained																	
Marks available	4	4	4	3	5	4	7	5	4	3	7	8	5	8	3	6	80

**Question One: ( 4 marks)**

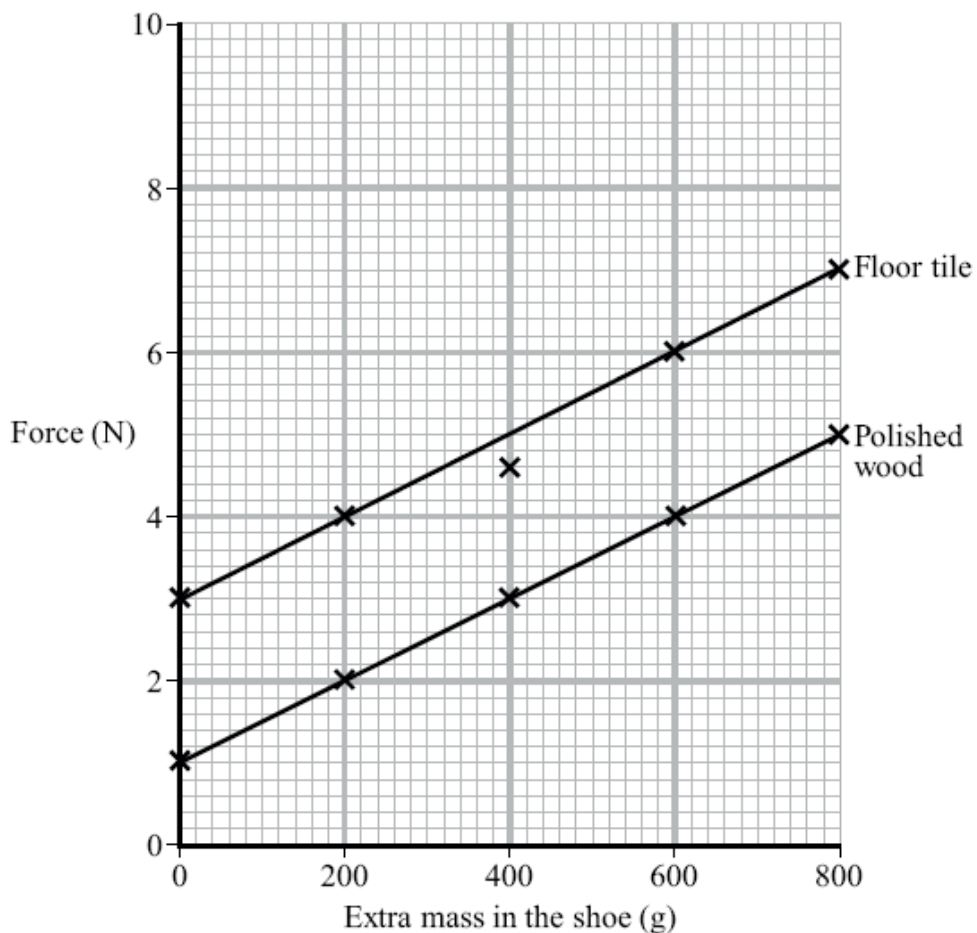
Some students did some experiments to measure the grip between a shoe and different floor coverings. They used a Newton meter to see how much force was needed to pull the shoe across the floor. They put extra masses in the shoe to see if it made any difference.



This table gives the forces needed to pull the shoe. The force was measured in Newton's.

Floor covering	Extra mass in the shoe				
	0g	200g	400g	600g	800g
Carpet	4	5.6	7.4	9	-
Floor tile	3	4	4.6	6	7
Polished wood	1	2	3	4	5

- a. Graphs of the results for the floor tile and the polished wood have been drawn. Use the same axes to plot a graph of the results for the carpet.



- b. The 400g result on the floor tile does not fit on the line.  
What should the student do to check this result?

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- b. Which floor covering is most likely to let you slip?

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- c. Give a reason why the force needed to pull the shoe across the floor changes.

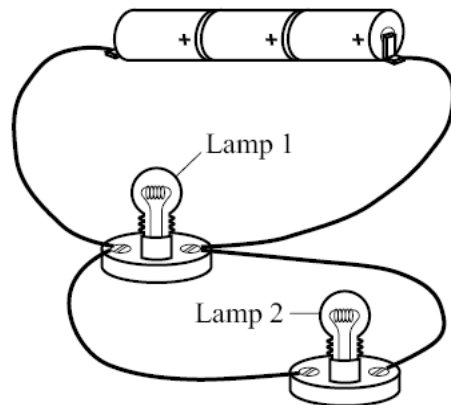
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**Question Two: (4 marks)**

The drawing shows three identical cells and two identical lamps joined in a circuit.



- a. Use the circuit symbols provided to draw a circuit diagram for this circuit.

b. Are these lamps wired in series or parallel? \_\_\_\_\_

c. Explain what would happen if one of the lamps died.

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**Question Three: (4 marks)**

a. When Mary combs her long hair she finds that after a while the hair “sticks” to the plastic comb. Explain this from the point of view of static electricity.

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b. Mary combed her hair for a while using a plastic comb and then suspended the comb on a thread. She then used a second comb, the same as the first, and after combing her hair for a few minutes, brought it near to the suspended comb. She noticed that the suspended comb was “pushed away” from the second comb by an invisible force.

Explain what is happening to cause these observations.

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c. Static electricity is produced in many situations in our daily lives. Describe another example of how it is made in an everyday situation.

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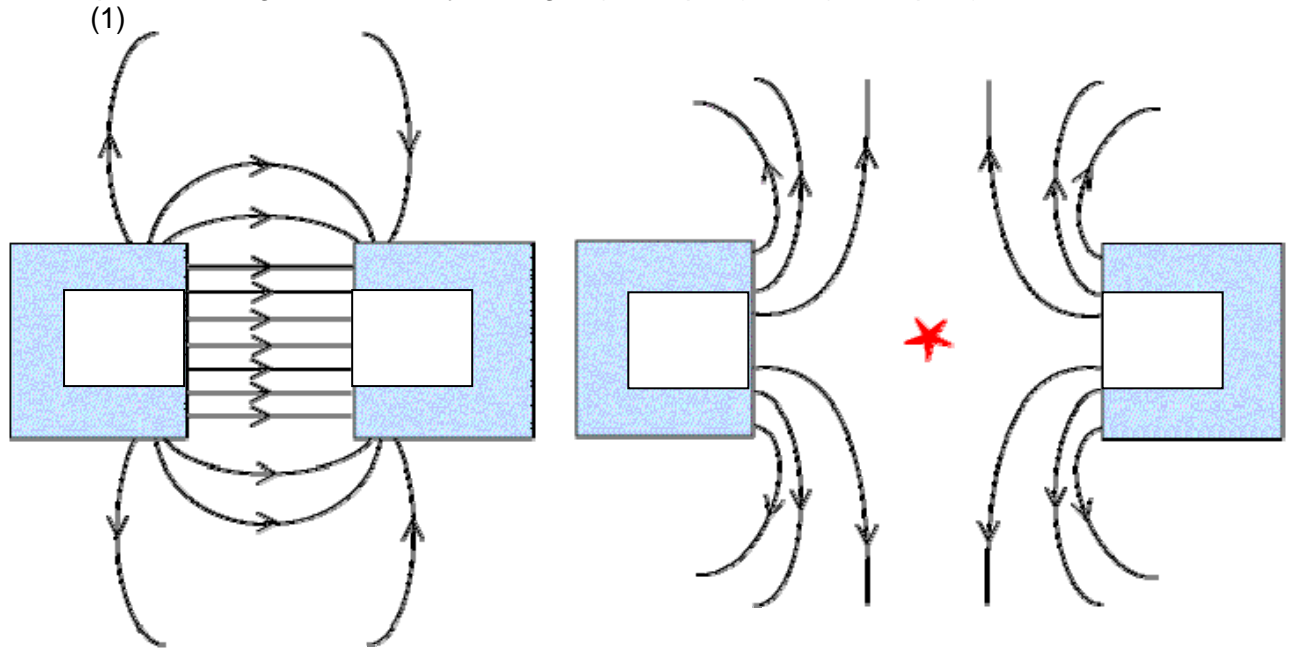
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**Question 4 ( 3 marks)**

a. Complete these sentences by adding the word(s) that fits best in the gap.

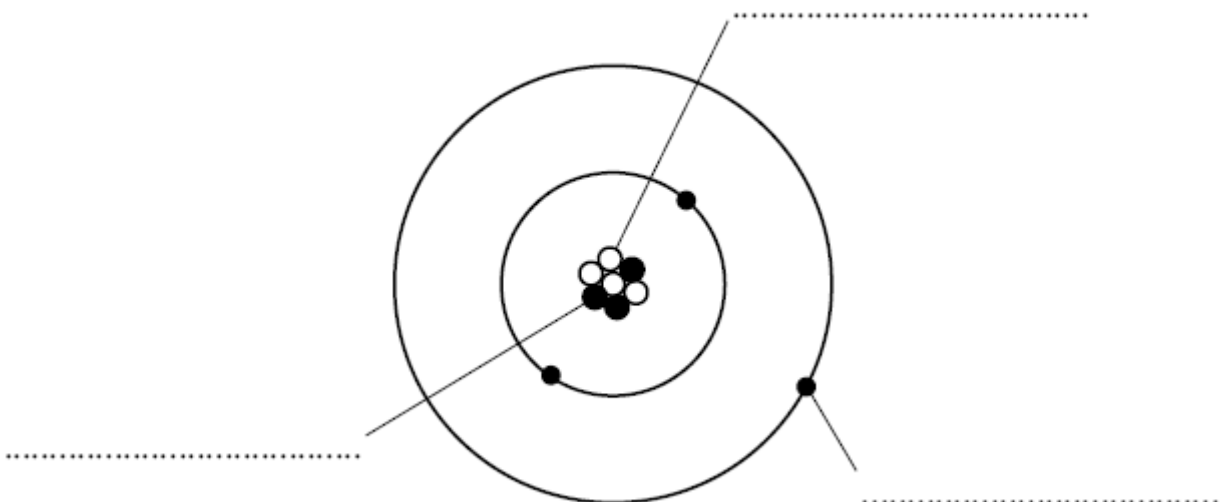
A magnet has a \_\_\_\_\_ and a \_\_\_\_\_. The \_\_\_\_\_ of one magnet attracts the \_\_\_\_\_ of another magnet, because \_\_\_\_\_ poles attract each other.

b. Complete the diagrams below by adding N (North pole) or S (South pole).



**Question 5: ( 5marks)**

The diagram represents an atom of lithium.



a. Complete the diagram by writing in the spaces the name of each type of sub atomic particle. Use only words given in the box. Each word may be used once or not at all.

Electron	Neutron	Nucleus	Proton
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- b. Which type of particle found inside the atom is uncharged? \_\_\_\_\_
- c. What is the mass number of this atom? 3, 4, 7 or 10? \_\_\_\_\_
- d. Give a reason for your choice.

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- e. Elements in the periodic table are arranged in order of: (write letter of your answer in the box)

- A chemical reactivity  
 B date of discovery  
 C atomic number  
 D percentage in the Earth's crust

**Question 6: (4marks)**

H							He
Li	Be	B	C	N	O	F	Ne
Na	Mg	Al	Si	P	S	Cl	Ar
K	Ca						

- a. Write the electron arrangements for the following atoms:



- b. The electron arrangement of an atom is **2,8,8**.

i. Name the element with this electron arrangement. \_\_\_\_\_

ii. Describe a special characteristic of this element that relates to its electron arrangement.

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**Question 7: (7 marks)**

Brian reacted some magnesium ribbon with hydrochloric acid in a test tube as shown below and collected the gas produced in an inverted test tube. He then held a lighted match near the mouth of the inverted test tube.

- a. Name the gas that Brian collected in the test tube. \_\_\_\_\_
- b. What result would you expect from the lighted match being held at the mouth of the inverted test tube.

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- c. Explain why Brian collected the gas in an upside-down test tube.

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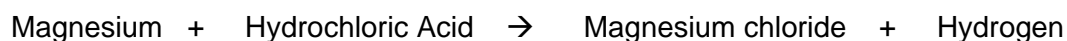
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- d. The gas Brian produced can also be collected by a method called displacement of water. Draw a labelled diagram to show how gases can be collected by **displacement of water**.

- e. Word equation for the above reaction:



- i. Name the **Reactants** of this equation: \_\_\_\_\_

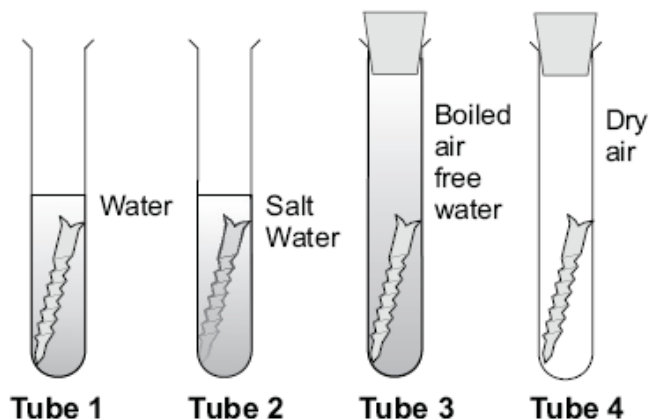
- ii Name the **Products** of this reaction: \_\_\_\_\_

**Question 8: ( 5marks)**

Four test tubes shown opposite were set up to investigate the corrosion of iron nails.

a. What is the common name for the corrosion of iron?  
\_\_\_\_\_

b. What TWO things must be present for iron to corrode?  
\_\_\_\_\_  
\_\_\_\_\_



c. Explain why there is no corrosion in Tube 3?  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

d. Explain why there is no corrosion in Tube 4?  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

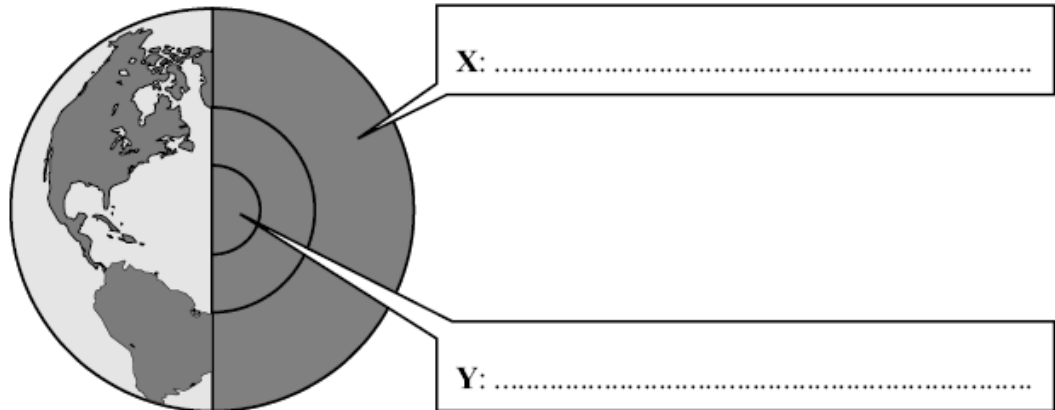
e. The iron hull of a ship is painted to protect the metal. Explain how painting the hull of the ship prevents it from corroding.  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_



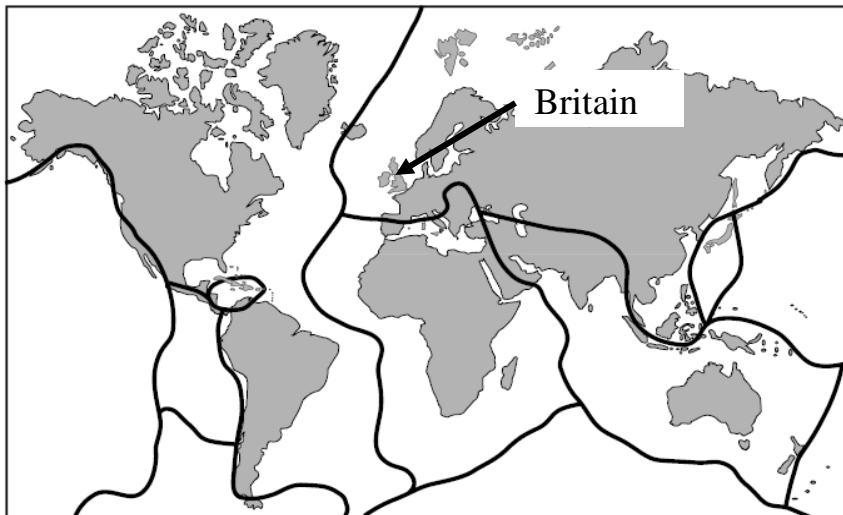


**Question 9: ( 4marks)**

- a. The diagram shows the layered structure of the Earth.  
Label the parts X and Y



Scientists now think that the outer layer of the Earth is cracked into a number of large pieces called tectonic plates. The tectonic plates are moving very slowly. The lines on the diagram show the boundaries between the major tectonic plates.



- i. Discuss what forces cause these large tectonic plates to move.

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ii. Explain why there are no major earthquakes in Britain.

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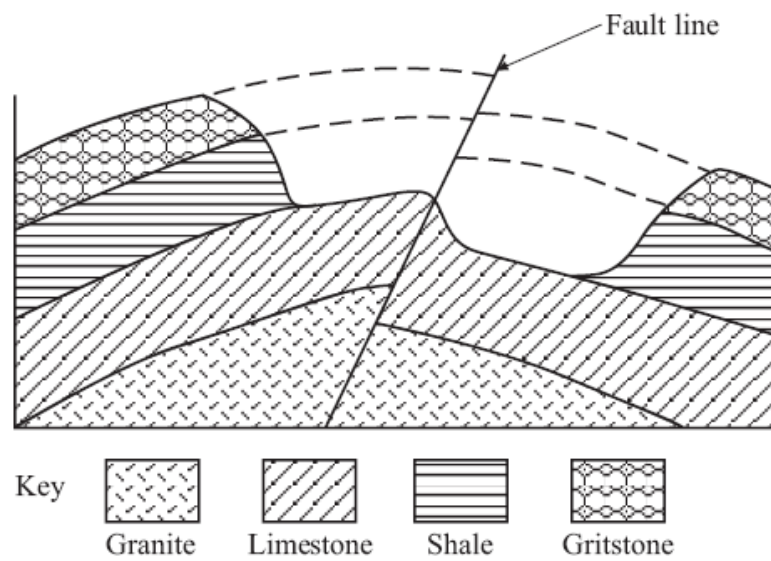
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**Question 10: (3 marks)**

The diagram shows the different layers of rock in a section of the Earth's crust.



- a. Give the name of the youngest sedimentary rock in the diagram. \_\_\_\_\_
- b. How many layers of sedimentary rocks are there? \_\_\_\_\_
- c. Explain what has caused the fault line.

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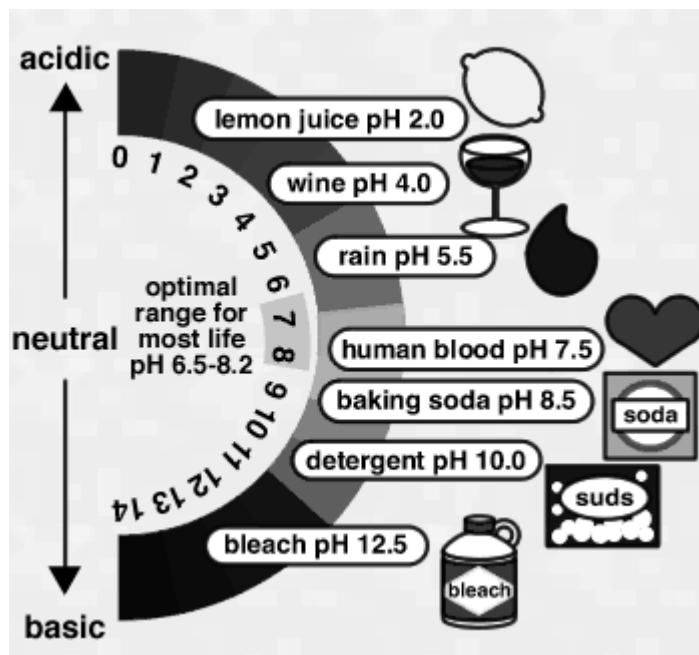
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**Question 11: ( 7 marks)**

Here is a diagram of the pH scale. Use it to help you answer the questions below.



a. Name a chemical that could be used to test for all the substances above.

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b. i) Give an example of a strong base. \_\_\_\_\_

ii) Give an example of a weak acid . \_\_\_\_\_

c. If you were stung by a bee, which of the above substances would you apply to it and why?

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d. What colour would universal indicator be if you added it to each of the following substances?

i. Lemon juice: \_\_\_\_\_

ii. Sodium hydroxide; \_\_\_\_\_

iii. Distilled water: \_\_\_\_\_

iv. Hydrochloric acid: \_\_\_\_\_

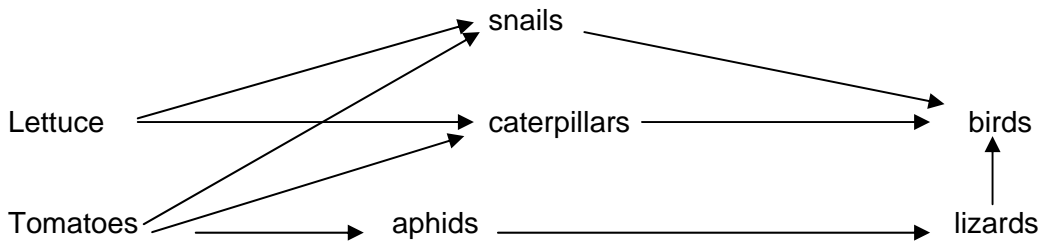
v. Baking soda: \_\_\_\_\_

**Question 12: ( 8 marks)**

a. Match the words with the sentences by **drawing a line** between the word and the correct definition.

<b>Word</b>		<b>Definition</b>
Competition	•	• feed on both plants and animals
Habitat	•	• number of organisms of the same kind living in a particular area
Population	•	• organisms which break down dead material
Carnivores	•	• animals which hunt their prey
Omnivores	•	• organisms requiring the same resources
Decomposer	•	• living place of an organism
Predator	•	• consumers which eat other animals

b. Helen has a vegetable garden. The food web shows some of the plants and animals, and what the animals eat.



i. What do the arrows represent?

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ii. Discuss what would happen if the population of caterpillars in the garden decreased?

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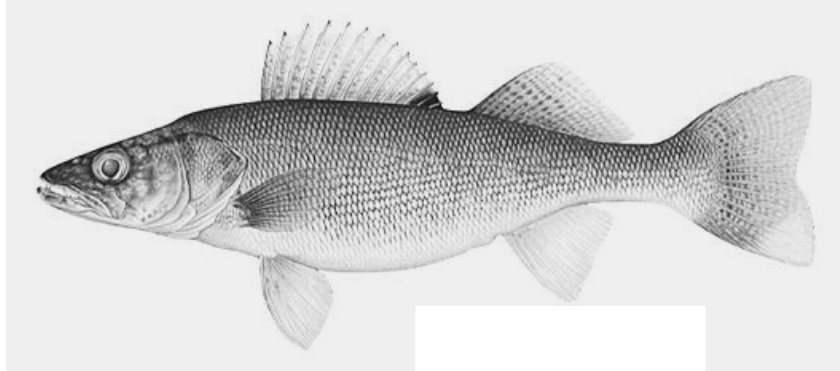


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iii. What type of consumer is the lizard? \_\_\_\_\_

iv. Draw one food chain from the food web.

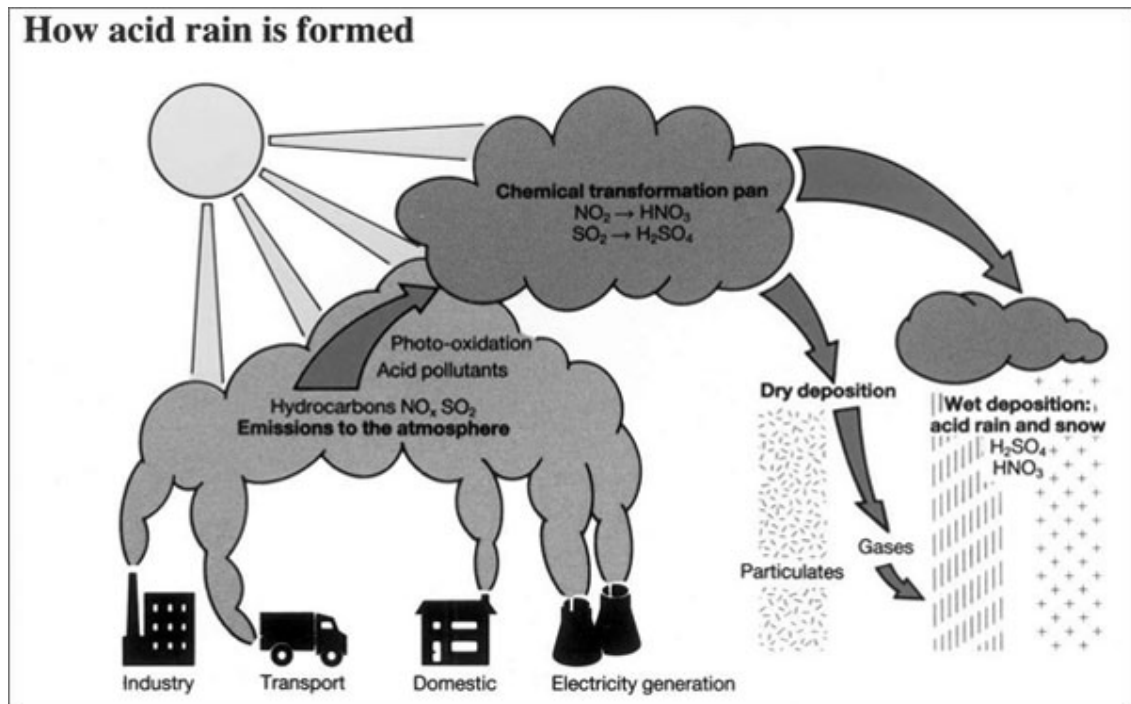
- c. Fish live in the ocean and have adaptations that help them survive.



Complete the table below by explaining how each adaptive feature helps the fish survive.

Adaptive feature	How it helps the fish survive

**Question 13: ( 5 marks)**



- a. Using the diagram above discuss how acid rain is formed.

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(there is more space on the next page)

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b. Two Year 10 students wanted to find out if the rain in New Zealand was acidic. Explain how these students would test the rain and what they would observe if the rain was acidic.

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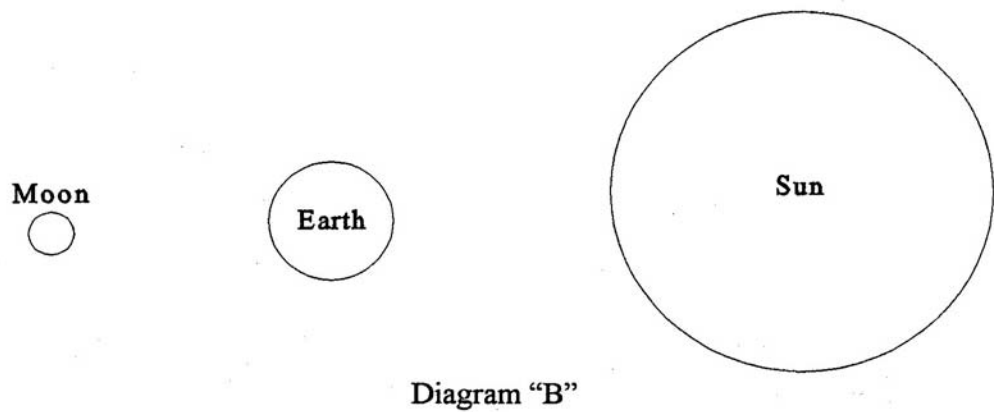
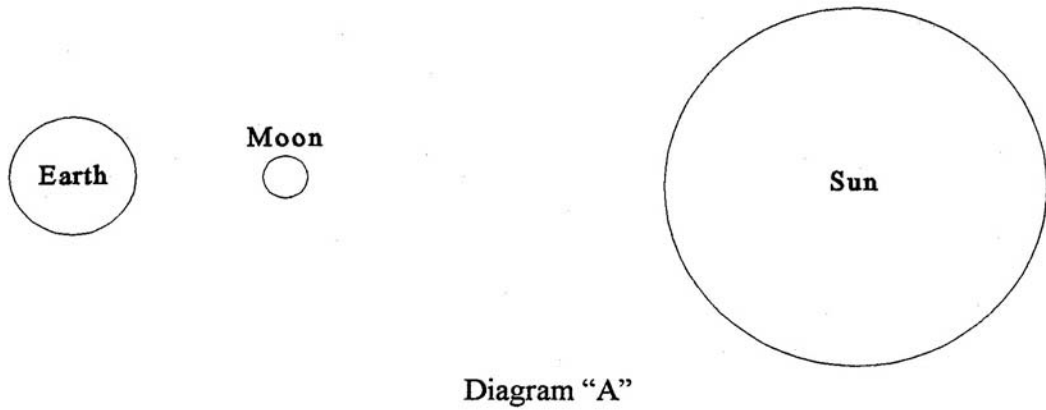
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**Question 14: ( 8 marks)**

The following diagrams illustrate positions of the Moon, Earth and Sun which cause eclipses.

a. Draw lines to show where the shadows would fall.



- b. What type of eclipse occurs in diagram A? \_\_\_\_\_
- c. What type of eclipse occurs in diagram B? \_\_\_\_\_
- d. Explain why a total eclipse is such a rare event. You may use a diagram in your answer

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e. This table shows some data about the planets.

Planet	Distance from the Sun (km)	Surface gravity (N/kg)	Average surface temperature (°C)	Density (kg/cm <sup>3</sup> )	Time of orbit (years)
Venus	108	9	470	5200	0.6
Earth	150	10	15	5500	1.0
Mars	228	5	-30	4000	1.9
Jupiter	778	26	-150	1300	12
Saturn	1427	11	-180	700	30
Pluto	5900	4	-230	500	248

Use the information from the table to answer the following questions.

i. Pluto is mainly gas. How can we tell this from the table?

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ii. What information suggests that Pluto has the largest mass?

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iii. On which planet would you have the least weight? \_\_\_\_\_

iv. Why is life possible on Earth but not on Jupiter? Give two reasons to explain your answer.

1.

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2.

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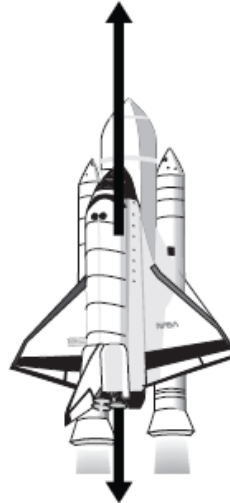


**Question 15: ( 3 marks)**

The arrows in the diagram represent the size and direction of the forces on a space shuttle, fuel tank and booster rockets one second after launch. The longer the arrows the bigger the force.

- a. Name the two forces acting on the space shuttle while it is being launched.

i.



ii.

- b. List all the energy types found in the launching space shuttle.

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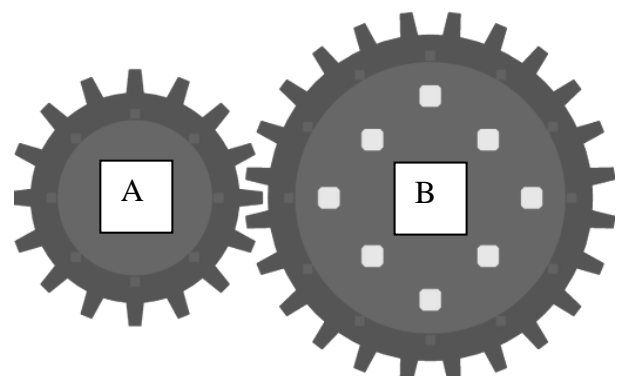
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**Question 16: ( 6 marks)**

Two gear wheels are connected as shown below.

- a. What will you observe happen to gear wheel A if gear wheel B turns one complete revolution in a clockwise direction?



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b. Name a machine that uses this type of gear arrangement.

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c. Each of the devices below works as a lever. Beside each one draw a simple diagram of how it works, labelling it with effort, load and pivot.

