

FULL NAME:	SCIENCE TEACHER: (circle code)	<b>9B</b>
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# SCIENCE

## Year 9 Examination 2011

### 9B – 80 marks

**Make sure that you have answered all the questions in this paper before you start paper 9A or 9C**

***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 (e.g. kg or m) unless they are already provided.

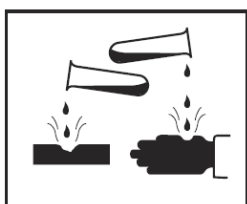
#### ***For Teacher Use***

Question	m/c	1	2	3	4	5	6	7	8	9	10	Total
Marks gained												
Marks available	40	5	4	3	4	2	3	4	4	5	6	80

**Question One: Skills in Science. [5 marks]**

- (a) Dangerous chemicals have hazard symbols on their containers. Why are symbols used instead of words?


- (b) Here are four hazard symbols.

**A****B****C****D**

- (i) Nitric acid is *corrosive*. Which symbol should be put on nitric acid? (circle your answer)

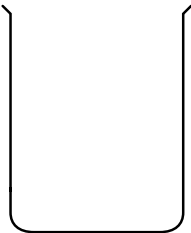
**A    B    C    D**

- (ii) Complete the following sentence.

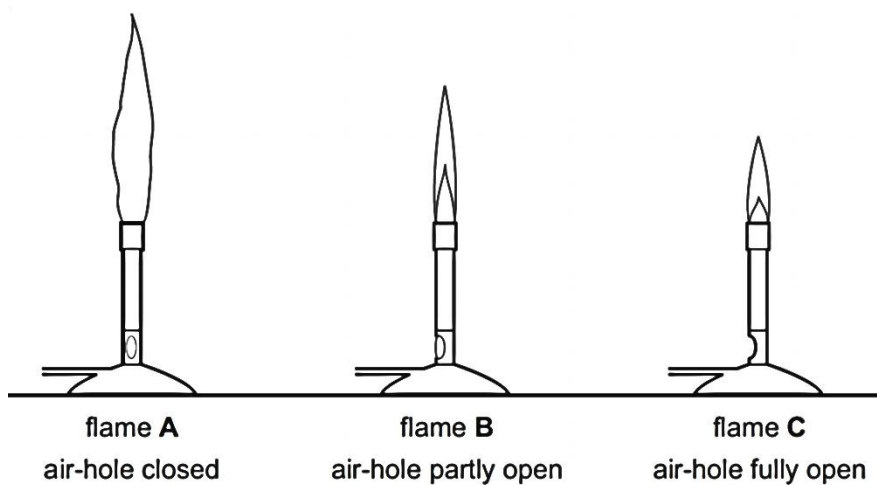
A bottle with symbol C contains a \_\_\_\_\_ substance.

- (c) In Science we use many pieces of scientific equipment.

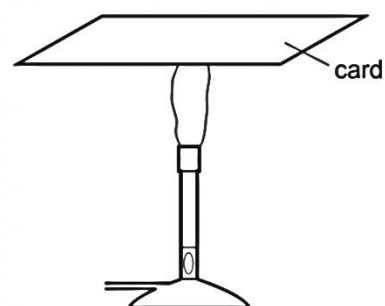
Draw the correct 2D **symbol** used to represent the following equipment. The beaker is done as an example. Use a ruler where you can.

1. beaker 	2. filter funnel	3. Bunsen burner	3. test tube
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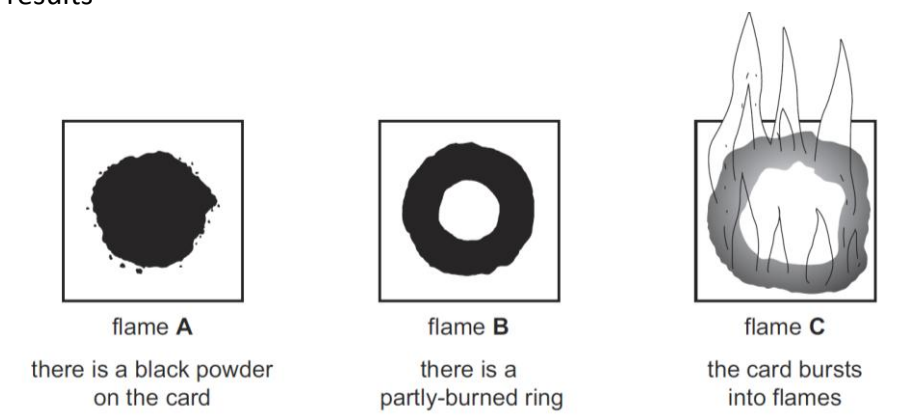
- (d) A science class are doing experiments with Bunsen burners. A student finds out that he can get three different types of flame using his Bunsen burner.



He holds a thin white card horizontally in each flame for about 5 seconds, as shown.



Here are the results

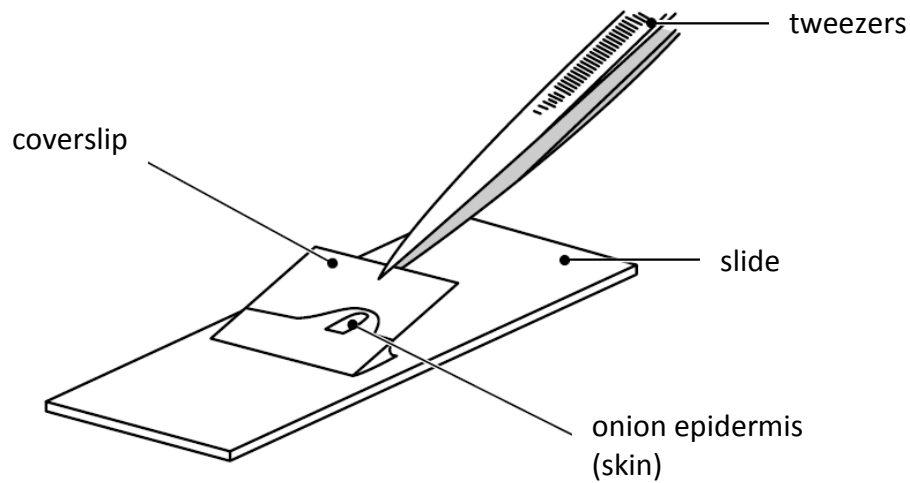


- (i) Suggest why there is a partly-burned ring with an unburned centre, on the card that was held in flame B.


- (ii) Suggest why the card burst into flames quickly with flame C

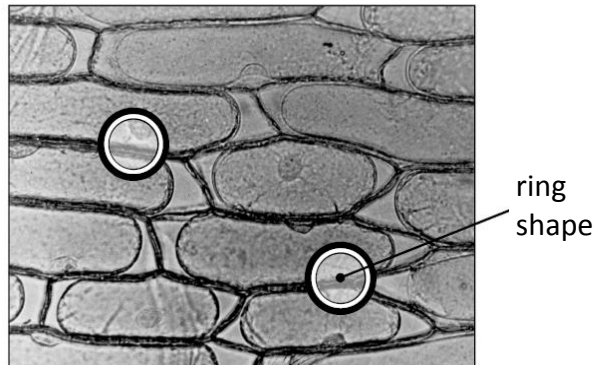

**Question Two: Under the microscope [4 marks]**

The diagram shows a microscope slide being prepared.



- (a) Explain why iodine solution is placed on the onion skin.

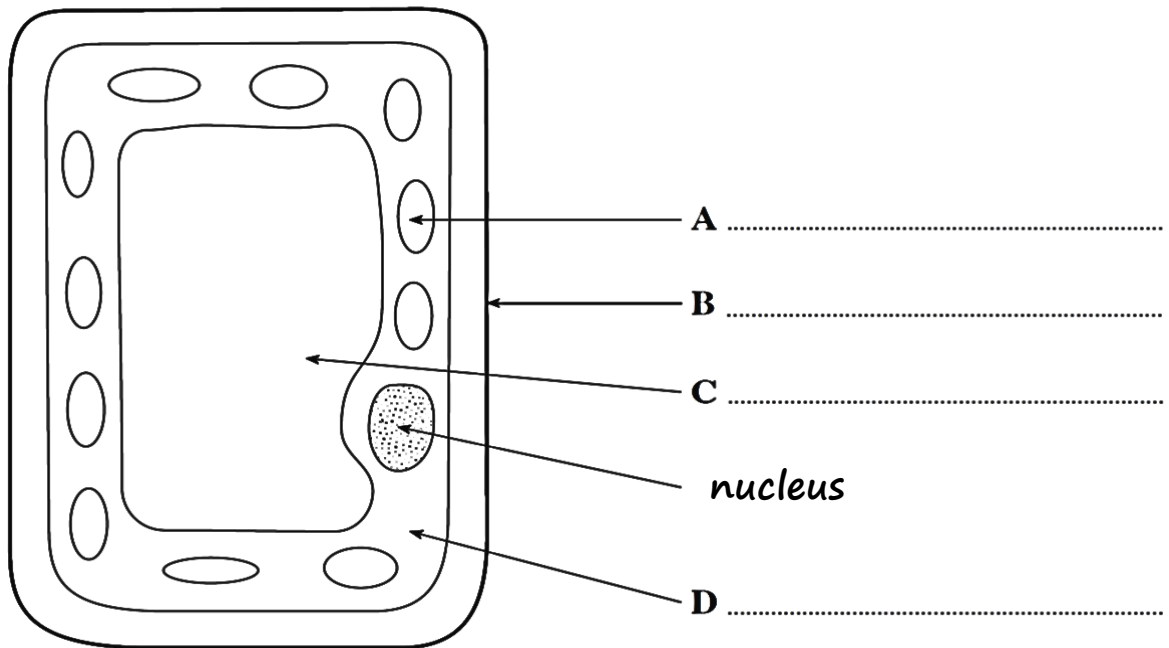

- (b) The drawing shows the appearance of a prepared slide. What causes the ring shapes and how should they be avoided?




Living organisms are made up of cells that can do different jobs.

(c) The diagram below shows a cell. Label **A**, **B**, **C** and **D** by choosing words from the list.

chloroplast ● vacuole ● cytoplasm ● cell wall ● cell membrane ● starch grain

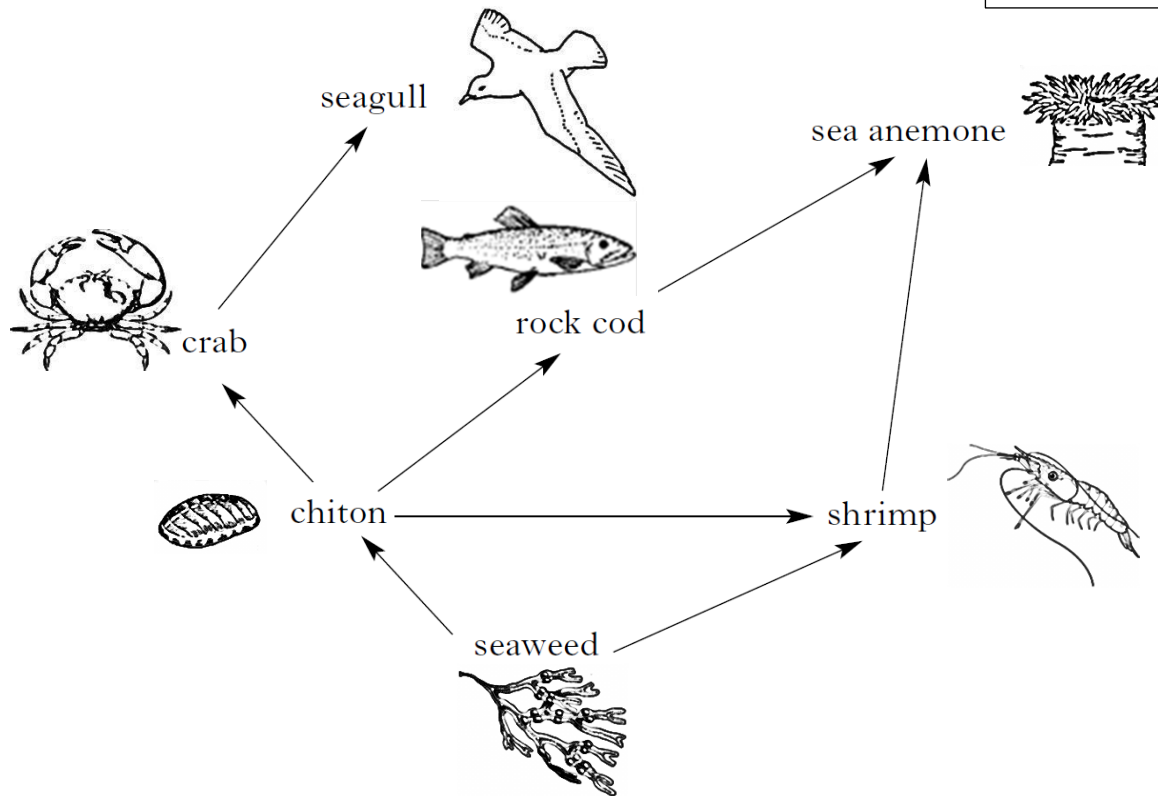


(d) Give one way that you know the cell above is from a plant.


**Question Three: Feeding Relationships [3 marks]**

A food web from a rocky shore is shown below.

Plants & animals are  
NOT drawn to scale



- (a) Using the food web above, give a food chain showing **four** organisms.

_____	→	_____	→	_____	→	_____
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- (b) Complete the following sentences by circling the correct answer.

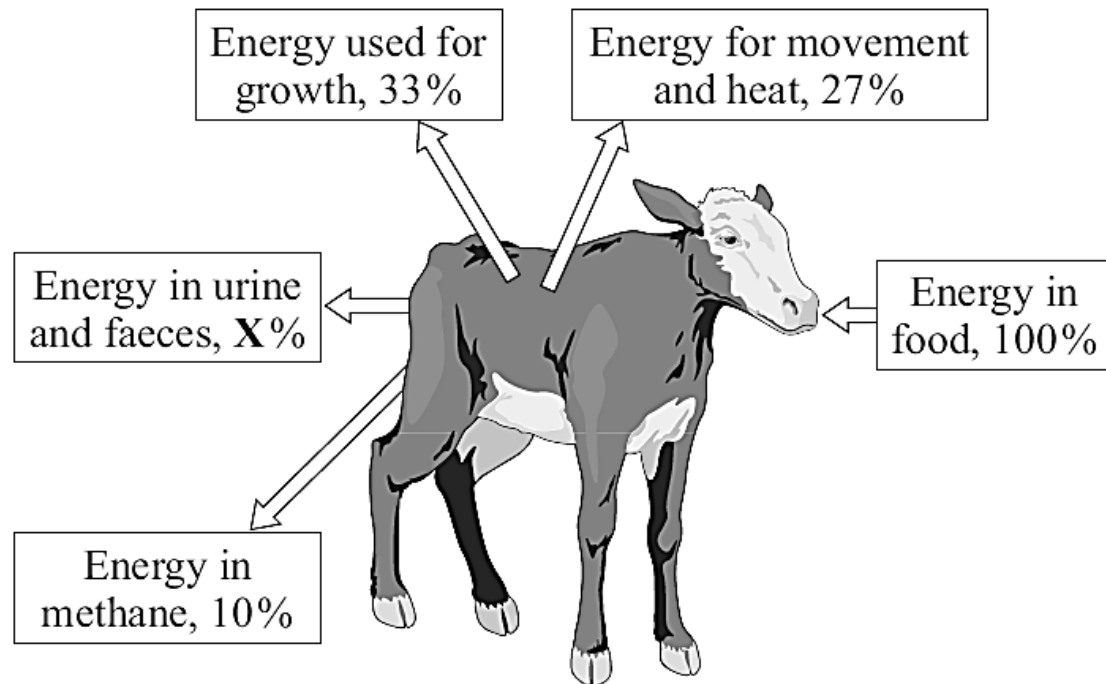
- (i) The sea anemone is a *PRODUCER* / *CONSUMER* because it eats other organisms.
- (ii) The crab is the *PREDATOR* / *PREY* of the seagull.
- (iii) The energy from the sun is used by the *SEAWEED* / *CHITON* to make food.

- (c) The rock cod population is wiped out by disease. How might this affect the number of seagulls?  
Explain your answer.

Seagull numbers will <b>increase</b> / <b>decrease</b> / <b>stay the same</b> (circle your answer) because....

**Question Four: Energy [4 marks]**

- (a) The diagram shows what happens to the energy in the food that a calf eats.



Calculate the % energy lost as urine and faeces (X). Show clearly how you work out your answer.


- (b) We need energy resources to generate electricity.

Some examples of energy resources are listed in below. Three of the energy resources in the table are renewable energy resources.

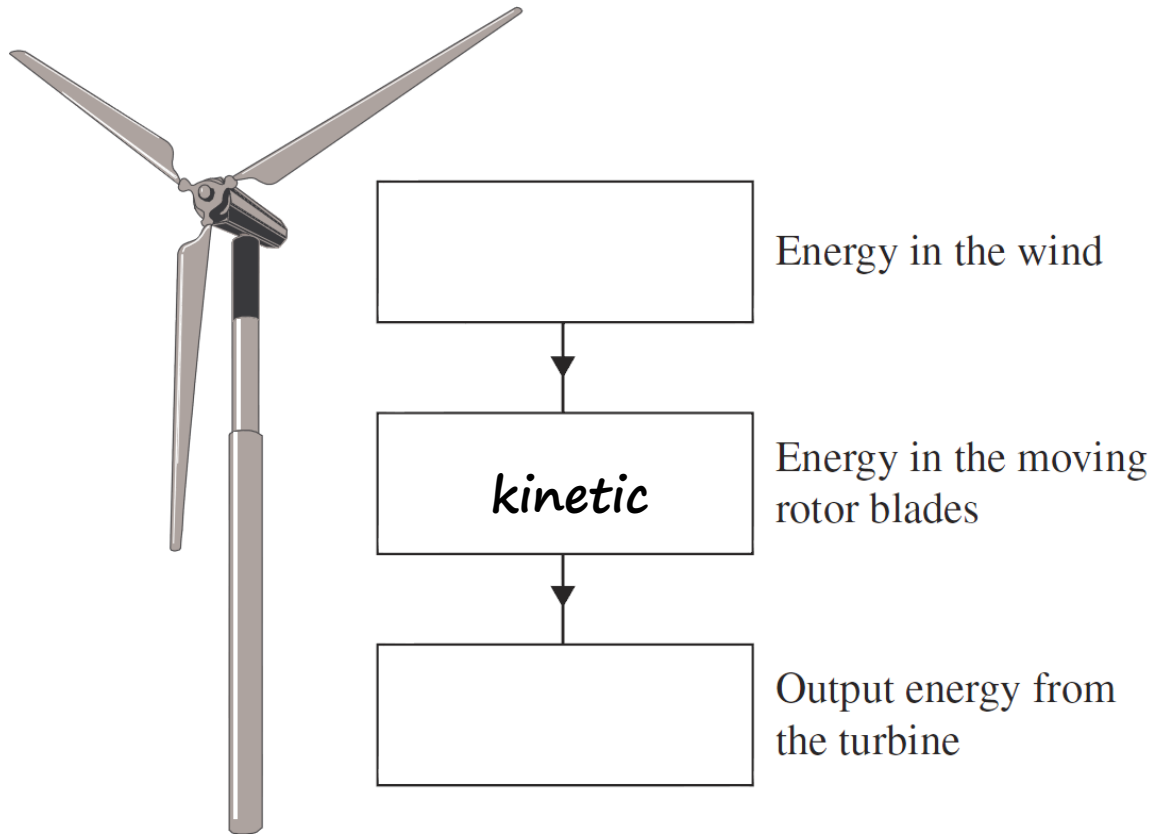
Put a tick in the boxes next to the **three** renewable energy resources.

- |  |                                       |
|--|---------------------------------------|
| <input type="checkbox"/> Coal                | <input type="checkbox"/> Oil          |
| <input type="checkbox"/> Hydroelectric power | <input type="checkbox"/> Solar energy |
| <input type="checkbox"/> Natural gas         | <input type="checkbox"/> Wind energy  |

(c) The use of wind turbines is increasing

- (i) Complete the boxes below naming the main energy changes taking place in a wind turbine. Choose words from the list below. **You may use words more than once or not at all.**

electrical • gravitational potential • heat • light • kinetic • nuclear



Wind turbines do not produce pollution like fossil fuels do.

- (ii) What is the main **disadvantage** of wind turbines compared with the use of fossil fuels?




### Question Five: Dissolving [2 marks]

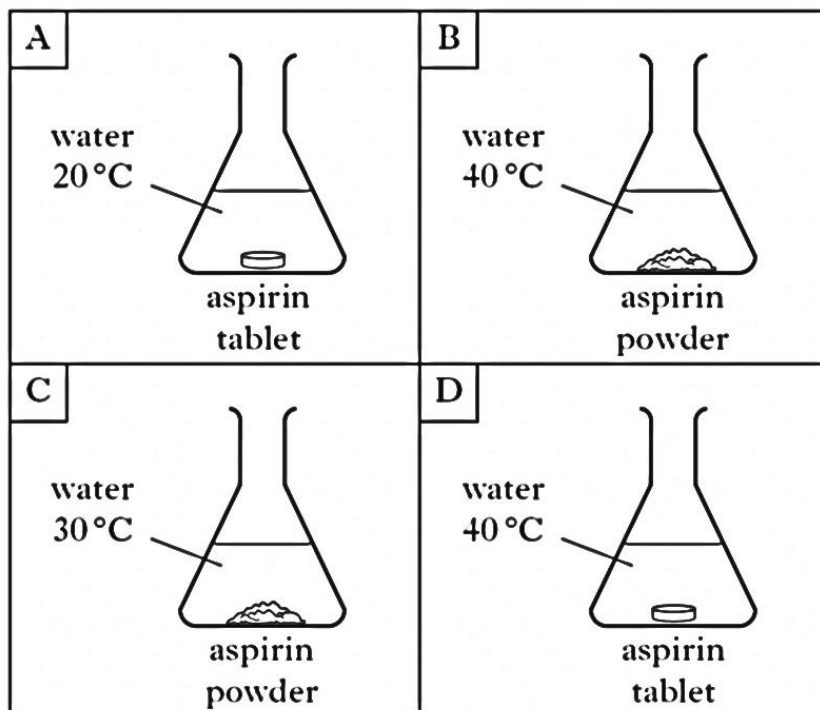
Soluble tablets are dropped into a glass of water and dissolved.

(a) Circle the word from the list below which describes the tablet.

solvent      solute      solution      saturated



(b) A student set up four experiments to investigate the solubility of aspirin.



Identify the experiment in which the aspirin would take the longest time to dissolve.

### Question Six: Particles [3 marks]

Some deodorants are sold in an aerosol spray, similar to the one shown in the diagram below. Aerosols contain a compressed gas. When the button is pressed the gas is released carrying the deodorant with it.



(a) Explain, in terms of particles, why gases can be compressed.


The following warning is printed on aerosol cans.

**Do not expose to temperatures above 50°C**

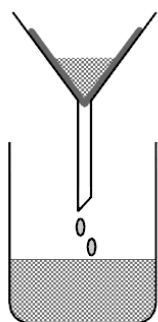
- (b) What TWO things happen to the particles of the gas in the aerosol can when the temperature is increased?

1
2

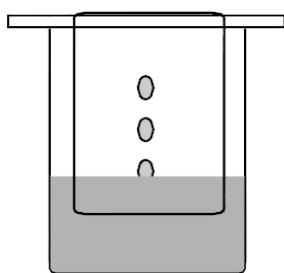
- (c) When the aerosol can is “empty”, a small number of gas particles remain. Shade in the aerosol can below to show the position of the remaining gas particles in the container.



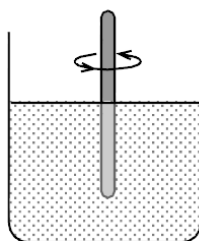
**Question Seven: Separating Mixtures [4 marks]**



Filtering



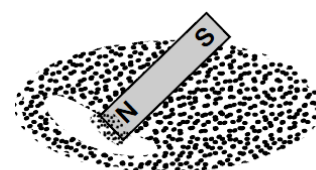
Chromatography



Dissolving



Evaporation



Magnetism

- (a) Which of the methods above would be *most suitable* for separating the following:

- (i) salt from salty water?

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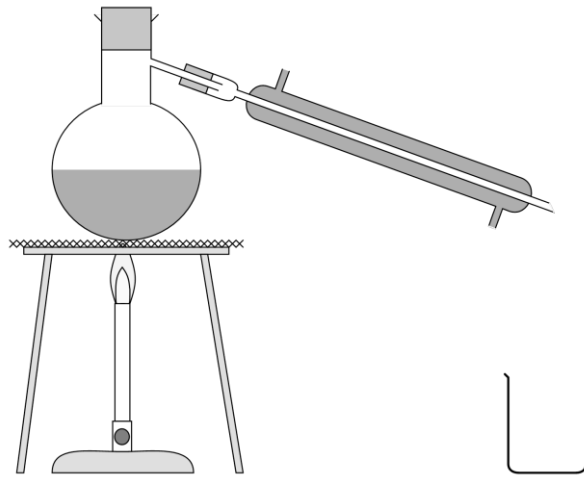
- (ii) colours in a dye?

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- (iii) iron filings from a mixture of iron filings and sulfur?

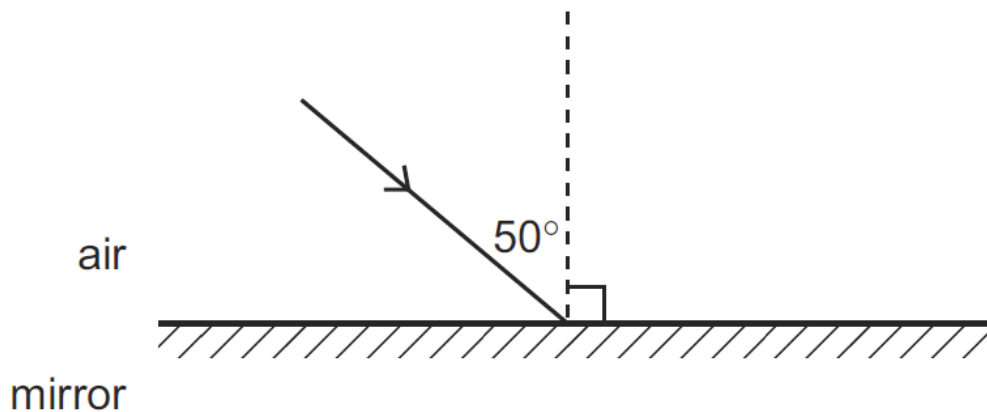
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- (b) Explain how distillation is able to separate a mixture of ink and water. You could label / complete the diagram to help explain your answer.




**Question Eight: Light [4 marks]**

- (a) The diagram shows a ray of light hitting a mirror.



- On diagram, label the **normal**.
- On diagram, draw the reflected ray, as accurately as you can. (There is no need to use a protractor but use a ruler).

- (b) A student sets up two experiments. In both experiments he has a torch, two pieces of card with holes in them and a screen. The first experiment is shown in diagram 1.

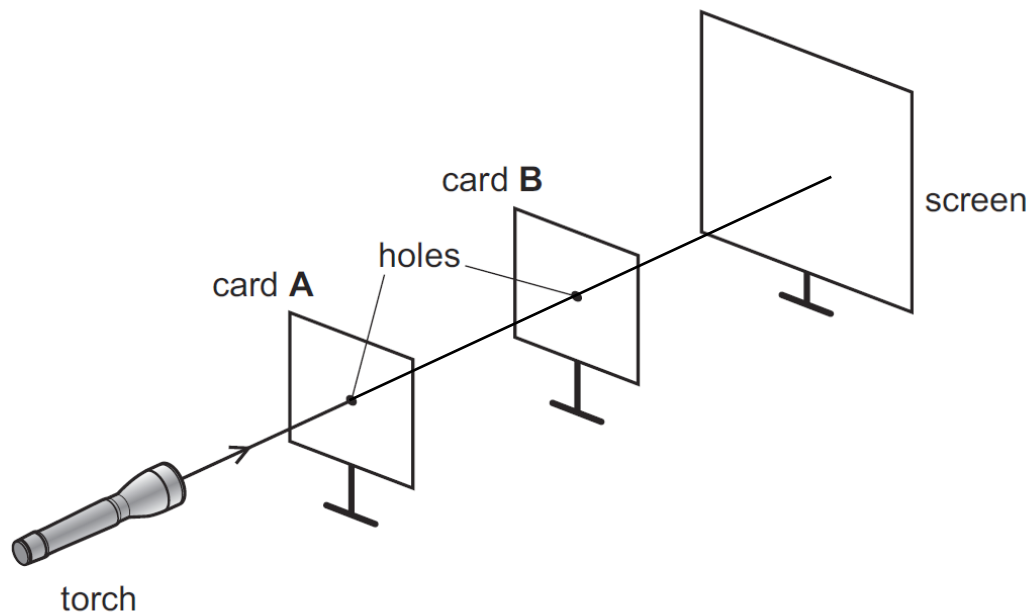


diagram 1

The scientist **could see** a spot of light on the screen.

The second experiment is shown in diagram 2. Using a ruler, draw the ray of light to show its path on diagram 2.

Explain why the light is **able / unable** to reach the screen.

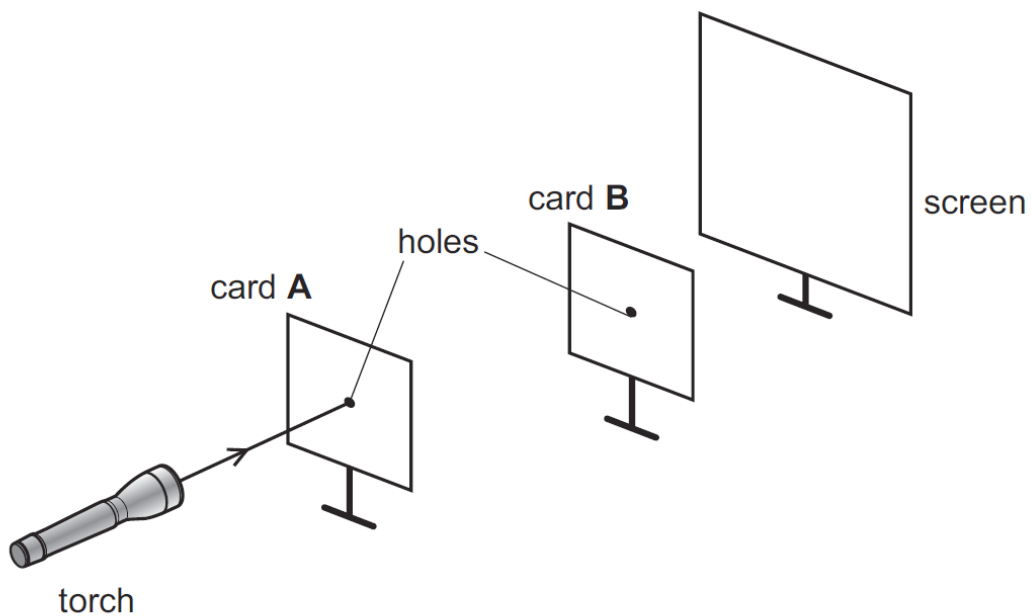
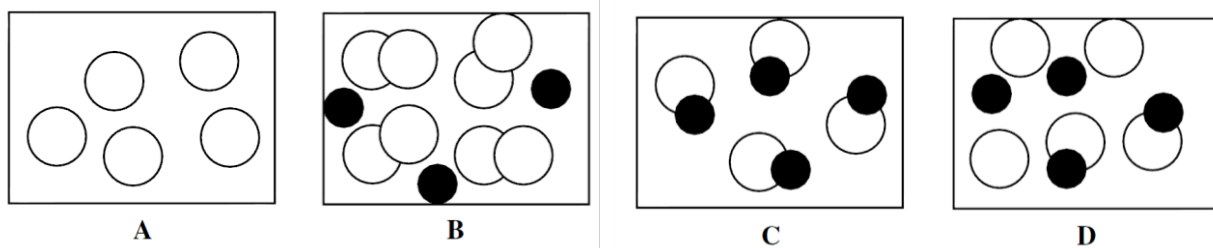


diagram 2


**Question Nine: Particles & the atom [5 marks]**

(a) Look at the particle pictures below. Only THREE pictures will be needed.



Which box contains:

(i) only a pure compound? \_\_\_\_\_

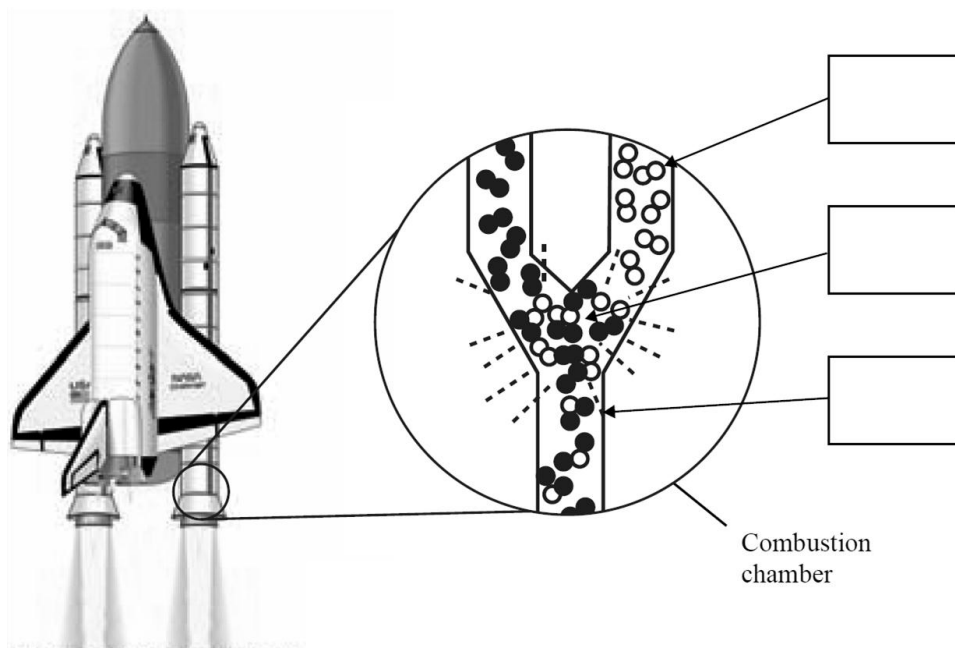
(ii) a mixture of elements? \_\_\_\_\_

(iii) a mixture of elements and a compound? \_\_\_\_\_

(b) Hydrogen is a powerful rocket fuel. The diagram shows the reaction which occurs in the combustion chamber of a rocket.

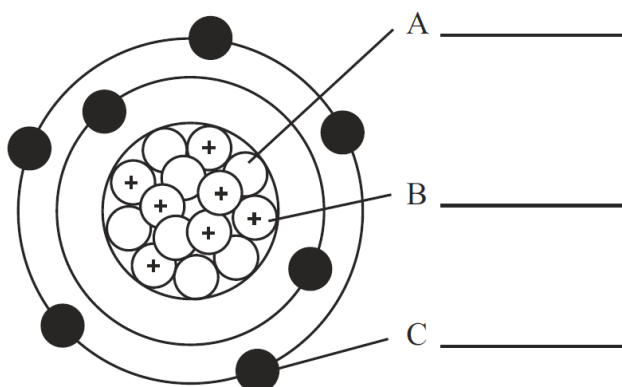
Using the letters E, F and G below, complete the diagram above by placing a letter to label each arrow in the boxes on the right of the diagram opposite.

- E oxygen molecules  
 F mixture of hydrogen & oxygen molecules  
 G water, a compound of hydrogen & oxygen



- (c) Elements are made up of atoms. The diagram below shows an atom of nitrogen. Label the diagram, choosing from these words.

● proton ● electron ● nucleus ● shell ● neutron ● positron ●



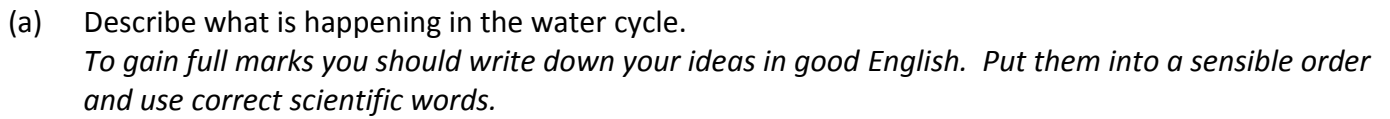
- (d) The atomic number of nitrogen is 7. What is the mass number of nitrogen? \_\_\_\_\_

Iron can be mixed with other elements to produce steel for different uses.



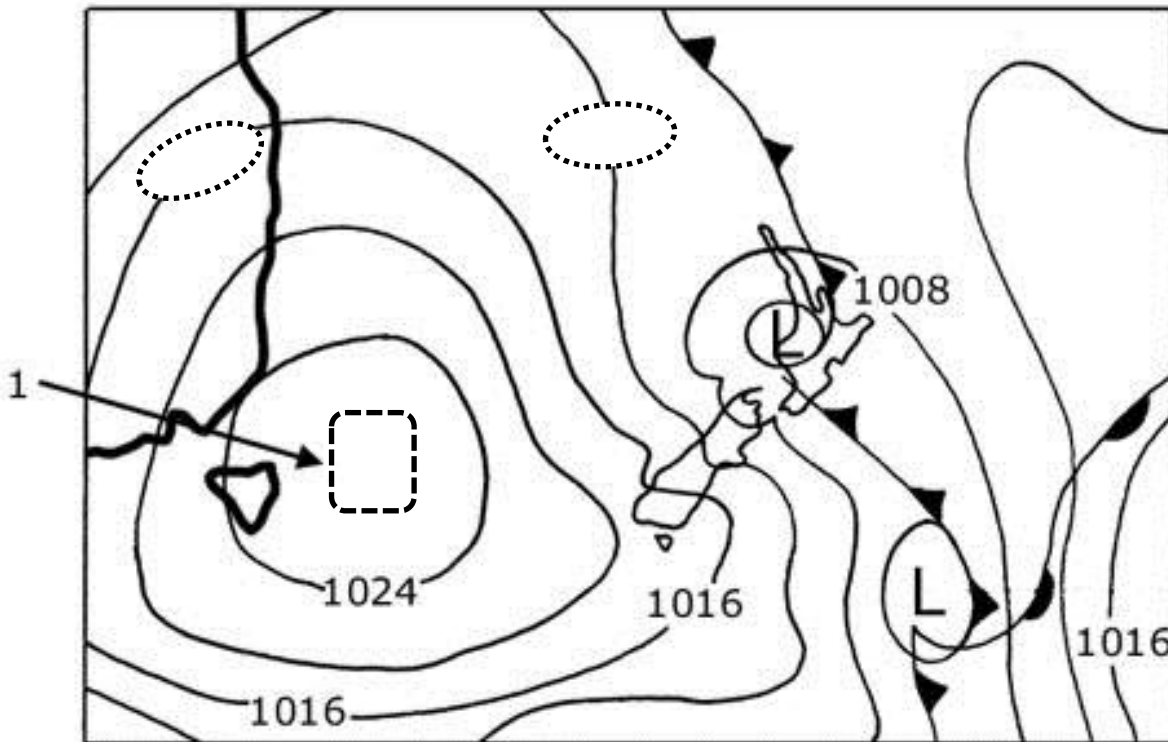
Chromium is added to make steel suitable for use in cooking pots. Railway tracks are made from steel which contains manganese. Titanium is added to make steel suitable for aircraft parts while adding tungsten produces steel used to make tools such as hammers.

- (e) Present the above information in a table with suitable headings.


[illegible]

(b) Study the weather map below.

- (i) What letter, H or L should be written at 1? Write it on the map.
- (ii) What number(s) should be written in the **two** oval shapes? Write them on the map.
- (iii) Label the cold front.



(c) Complete the following choosing the correct word from each pair in *italics*.

Winds blow (more or less) *parallel* / *at 90°* to the isobars

In the southern hemisphere winds blow *anticlockwise* / *clockwise* around the centre of the low.

**Now do Part A or Part C**