

Surname							Other Names							
Centre Number							Candidate Number							
Candidate Signature														

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General Certificate of Secondary Education
June 2005

SCIENCE: DOUBLE AWARD A (MODULAR) 3468/1F
FOUNDATION TIER
Paper 1

Monday 6 June 2005 1.30 pm to 3.00 pm

F

<p>In addition to this paper you will require:</p> <ul style="list-style-type: none"> the Data Sheet (enclosed); a ruler. <p>You may use a calculator.</p>

For Examiner's Use			
Number	Mark	Number	Mark
1		10	
2		11	
3		12	
4		13	
5		14	
6		15	
7		16	
8		17	
9			
Total (Column 1)		→	
Total (Column 2)		→	
TOTAL			
Examiner's Initials			

Time allowed: 1 hour 30 minutes

Instructions

- Use blue or black ink or ball-point pen.
- Fill in the boxes at the top of this page.
- Answer **all** questions in the spaces provided.
- Do all rough work in this book. Cross through any work you do not want marked.

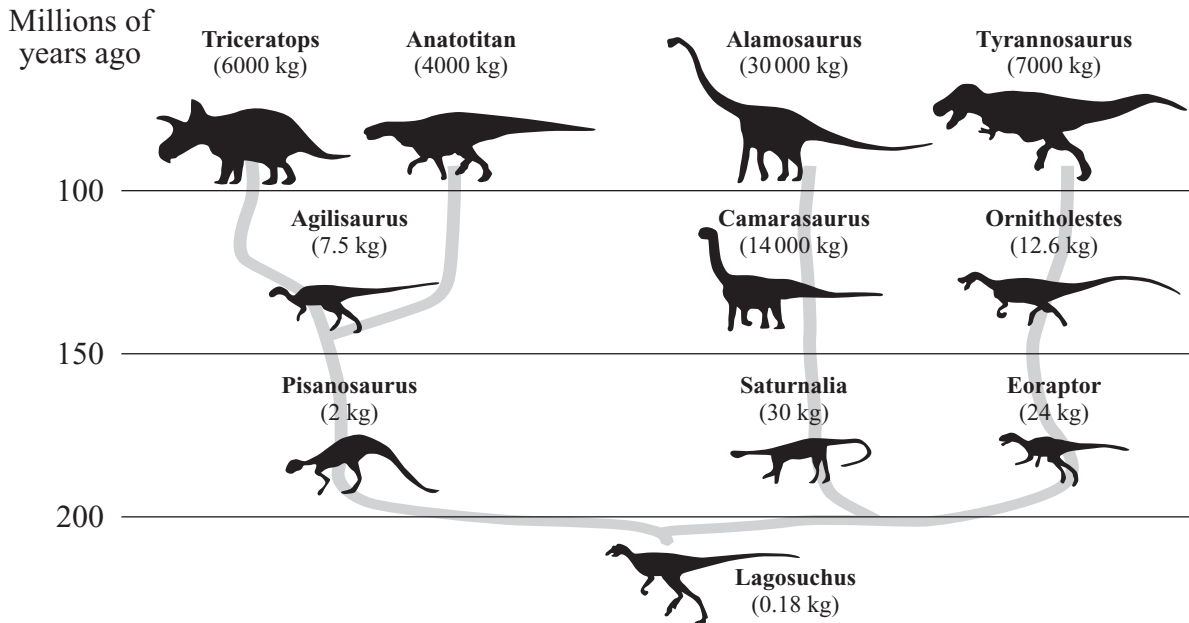
Information

- The maximum mark for this paper is 90.
- Mark allocations are shown in brackets.
- You are reminded of the need for good English and clear presentation in your answers.

INHERITANCE AND SELECTION

1 The diagram shows a timeline for the evolution of some dinosaurs.

The mass of each dinosaur is shown in the brackets by its name.



(a) Name **one** dinosaur which lived between 100 and 150 million years ago.

.....
(1 mark)

(b) Which dinosaur did Ornitholestes evolve from?

.....
(1 mark)

(c) Apart from body size and mass, give **one other** difference between Lagosuchus and Alamosaurus.

.....
.....
(1 mark)

(d) (i) Which dinosaur had the largest mass?

.....
(1 mark)

(ii) What happened to the mass of dinosaurs during evolution?

.....
.....
(1 mark)

(e) We know about dinosaurs from their fossils.

Describe **one** way in which fossils are formed.

.....
.....
(1 mark)

(f) Complete the sentence by using the correct words from the box.

billion	complex	large	million	simple	thousand
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The theory of evolution states that all species of living things have evolved from life forms which first developed more than three years ago.

(2 marks)

8

TURN OVER FOR THE NEXT QUESTION

Turn over ►

2 Carnation plants have attractive flowers.



(a) Carnation plants are grown from cuttings.

Complete the sentences by using the correct words from the box.

asexual	clones	genes	mutation	sexual
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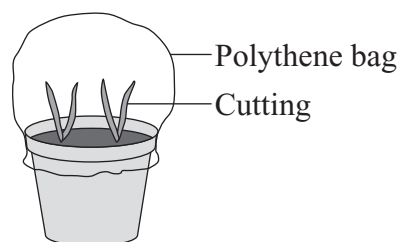
Carnations grown from cuttings have the same as their parents.

This type of reproduction is

The new plants are known as

(3 marks)

(b) Gardeners usually cover the cuttings with a polythene bag as shown in the diagram below.



Why do the cuttings grow better if gardeners do this?

.....

.....

(1 mark)

STRUCTURES AND BONDING

3 Use the periodic table on the Data Sheet to help you to answer these questions.

- (a) Write the symbol for helium.

.....
(1 mark)

- (b) Write the name of an element in Group 4.

.....
(1 mark)

- (c) Write the name of the element which has a relative atomic **mass** of 64.

.....
(1 mark)

- (d) Write the name of the element with the next highest atomic number after Te (tellurium) in the periodic table on the Data Sheet.

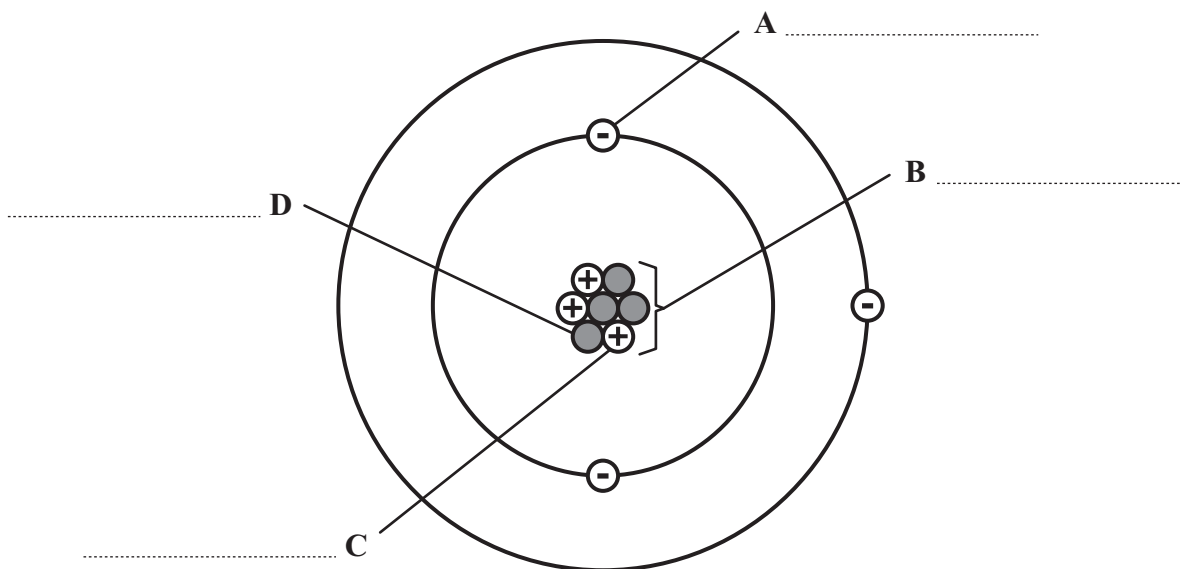
.....
(1 mark)

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4

TURN OVER FOR THE NEXT QUESTION

Turn over ►

4 The diagram shows an atom.



(a) On the diagram, write the names of structures **A**, **B**, **C** and **D**. (4 marks)

(b) To which Group of the periodic table does this atom belong?

.....

Give **one** reason for your answer.

.....

.....

(2 marks)

(c) Name the element which is made up of this type of atom.

.....

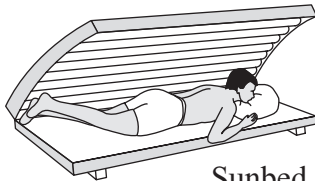
(1 mark)

WAVES AND RADIATION

5 The pictures show devices that use electromagnetic radiation.

Use words from the box to label each picture with the type of radiation used.

gamma rays infra red rays light ultraviolet rays microwaves X-rays



Sunbed

.....



Examining broken
bones

.....



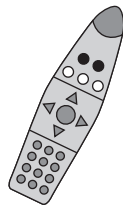
Mobile phone

.....



Sterilising surgical
instruments

.....



Television set
remote control

.....

(5 marks)

5

TURN OVER FOR THE NEXT QUESTION

Turn over ►

6 The table gives the frequencies of sound that different animals can hear.

Animal	Lowest frequency it can hear in Hz	Highest frequency it can hear in Hz
Human	64	23 000
Dog	67	45 000
Mouse	1 000	91 000
Rat	200	76 000
Cat	45	64 000
Tuna	50	1 100
Canary	250	8 000
Chicken	125	2 000

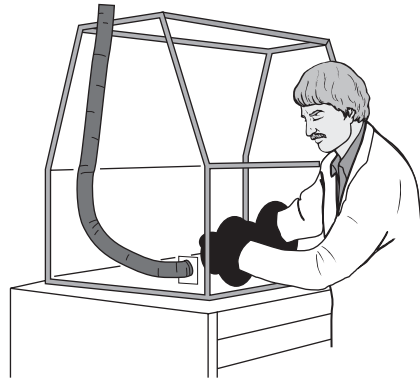
(a) (i) Which animal can hear the lowest sound frequency?
(1 mark)

(ii) Which animal can hear the smallest range of frequencies?
.....
(1 mark)

(b) (i) What is the name given to sound frequencies higher than those that humans can hear?
.....
(1 mark)

(ii) Give **one** industrial use of this type of sound.
.....
(1 mark)

7 The picture shows a man at work in a factory that uses radioactive materials.



The radioactive material is kept behind glass shields. The man wears gloves so that he cannot touch the radioactive material directly.

Explain, as fully as you can, why these precautions are taken.

To gain full marks in this question you should write your ideas in good English. Put them into a sensible order and use the correct scientific words.

.....

.....

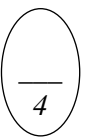
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(4 marks)

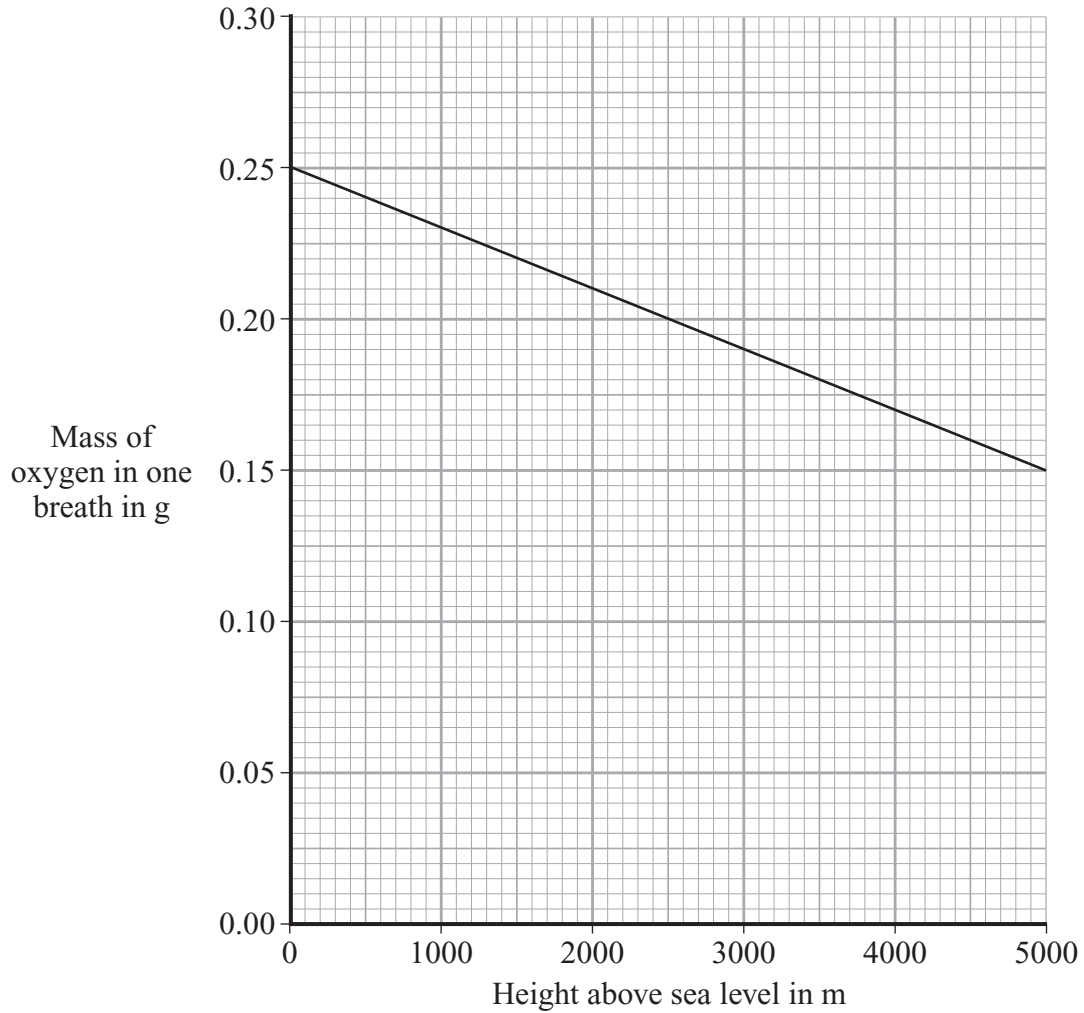


TURN OVER FOR THE NEXT QUESTION

Turn over ►

QUESTIONS RELATING TO PREVIOUSLY TESTED MODULES

8 (a) The graph shows how the mass of oxygen you breathe in changes as you climb up a mountain.



Describe, in as much detail as you can, how the mass of oxygen in one breath changes as you climb from sea level to 3000 m.

.....

.....

.....

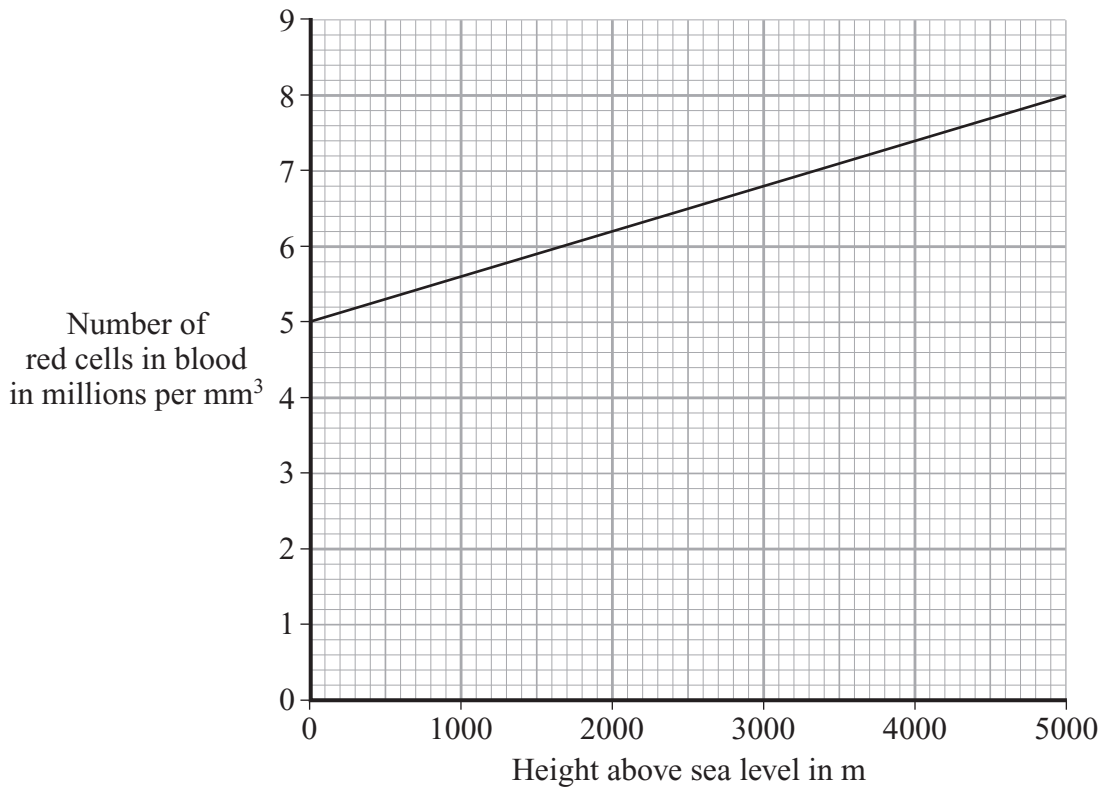
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.....

.....

(3 marks)

- (b) People who live high up in mountainous areas have more red blood cells than people who live at sea level. The graph below shows how the number of red blood cells changes with height above sea level.



- (i) How many more red blood cells does a person living at 3000 m above sea level have than someone living at sea level? Show clearly how you work out your answer.

.....

Increase in number of red blood cells = millions per mm³
 (2 marks)

- (ii) What is the advantage of having more red blood cells?

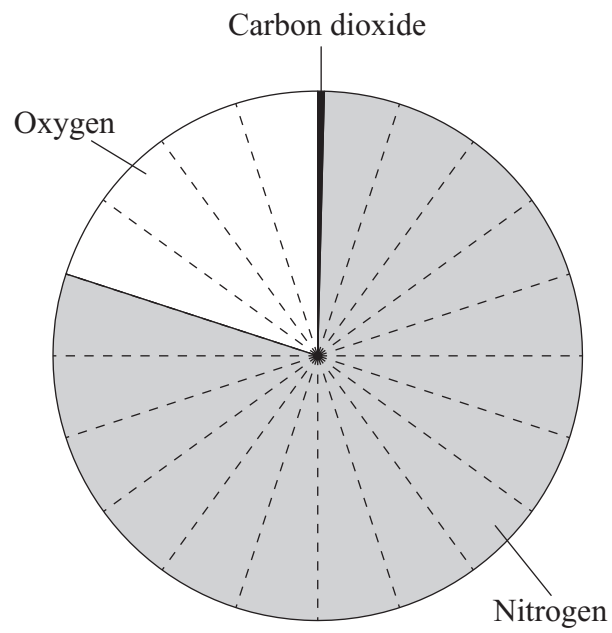
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(1 mark)

6

Turn over ►

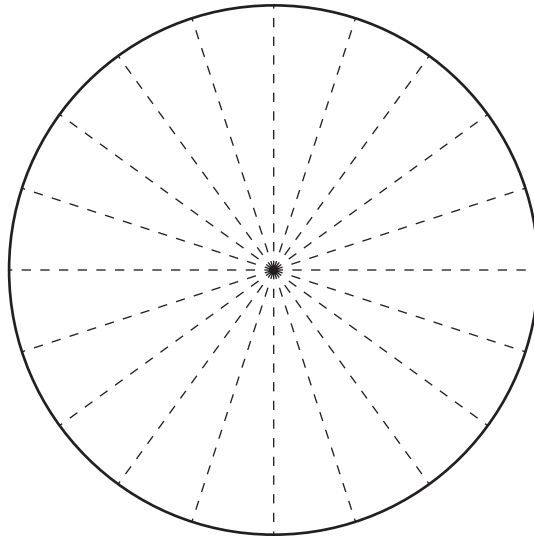
9 The pie chart shows the composition of the air we breathe in.



The table shows the composition of the air we breathe out.

Gas	Percentage
Carbon dioxide	5
Nitrogen	80
Oxygen	15

- (a) Complete the pie chart below for the composition of the air we breathe out. Remember to label the chart.



(3 marks)

- (b) Use the information from the two pie charts to give **two** differences between the air we breathe in and the air we breathe out.

The air we breathe in contains more

The air we breathe out contains more

(2 marks)

- (c) Name the process in the body which produces carbon dioxide.

.....

(1 mark)

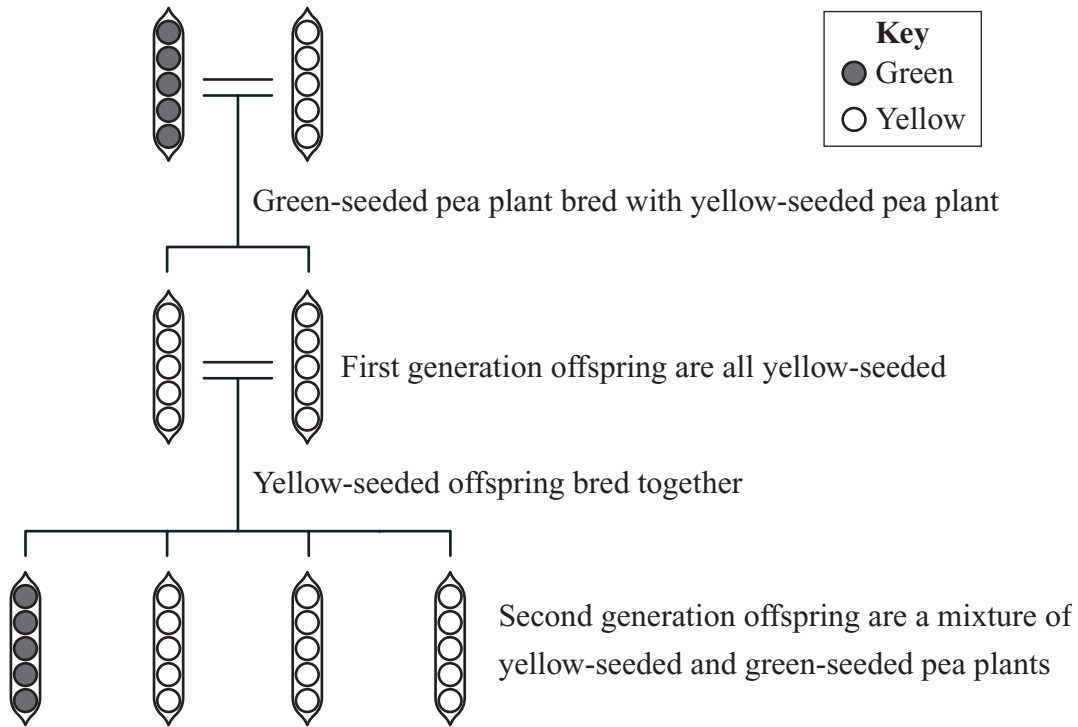
6

TURN OVER FOR THE NEXT QUESTION

Turn over ►

INHERITANCE AND SELECTION

10 The diagram shows one of the experiments performed by a scientist called Mendel in the 1850s. He bred pea plants which had different coloured pea seeds.



(a) Use words from the box to help you to explain the results of this experiment.

dominant	factor	recessive
-----------------	---------------	------------------

.....

.....

.....

.....

.....

.....

(3 marks)

(b) Mendel explained these results in terms of *inherited factors*.

(i) What do we now call *inherited factors*?

.....
(1 mark)

(ii) Where, in a cell, are these *inherited factors* found?

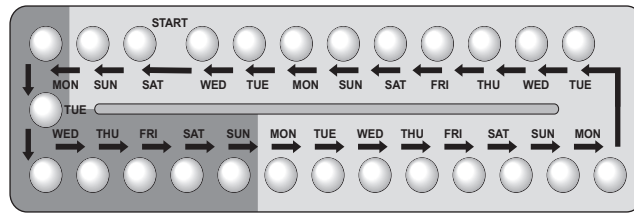
.....
(1 mark)

5

TURN OVER FOR THE NEXT QUESTION

Turn over ►

11 The picture shows some birth control (contraceptive) pills for women.



These are some facts about using birth control pills:

- birth control pills are 99 per cent effective in preventing pregnancy
- the hormones in the pills have some rare but serious side effects
- this method of birth control gives no protection against sexually transmitted diseases
- the hormones in the pills give protection against some women’s diseases
- the woman has to remember to take a pill every day
- the woman’s monthly periods become more regular.

Use the information above to answer these questions.

(a) Give **two** advantages of using birth control pills.

1

.....

2

.....

(2 marks)

(b) Give **two** disadvantages of using birth control pills.

1

.....

2

.....

(2 marks)

STRUCTURES AND BONDING

12 The table shows some properties of four Group 7 elements.

Element	Boiling point in °C	Melting point in °C	State at room temperature	Reaction with hydrogen	
				Description	Product
Fluorine	- 218	- 188	gas	Explosive reaction in dim light	Hydrogen fluoride
Chlorine	- 34	- 101	gas	Explosive reaction in sunlight	Hydrogen chloride
Bromine	+ 59	- 7		Reacts if heated	
Iodine	+ 185	+ 114		Reacts if heated strongly	Hydrogen iodide

(a) What is the state at room temperature of:

(i) bromine;

(ii) iodine?

(2 marks)

(b) Which **one** of the four elements is most reactive?

.....
(1 mark)

(c) Name the compound formed when hydrogen reacts with bromine.

.....
(1 mark)

TURN OVER FOR THE NEXT QUESTION

4

Turn over ►

- 13 (a) A piece of lithium is placed on the surface of some water in a beaker.
Hydrogen is given off.
Lithium hydroxide is also formed.

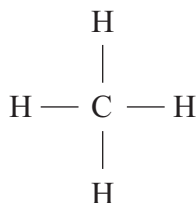
(i) Write a word equation for this reaction.

.....
(2 marks)

(ii) Describe the test for hydrogen.

.....
.....
.....
.....
(2 marks)

- (b) The diagram shows the structure of a molecule of methane.



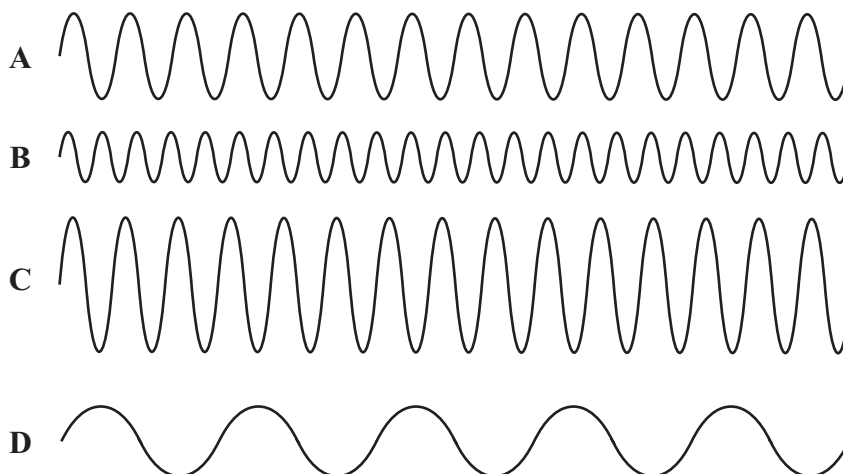
Write down everything that this diagram tells you about a methane molecule.

To gain full marks in this question you should write your ideas in good English. Put them into a sensible order and use the correct scientific words.

.....
.....
.....
.....
.....
.....
.....
.....
(4 marks)

WAVES AND RADIATION

- 14** The diagram shows oscilloscope traces of four waves, **A**, **B**, **C** and **D**. All four waves are drawn to the same scale.



Which wave has:

- (a) the longest wavelength;
- (b) the greatest amplitude;
- (c) the highest frequency?

(3 marks)

3

TURN OVER FOR THE NEXT QUESTION

Turn over ►

15 (a) Complete the sentences about atoms.

In an atom, the number of electrons is equal to the number of

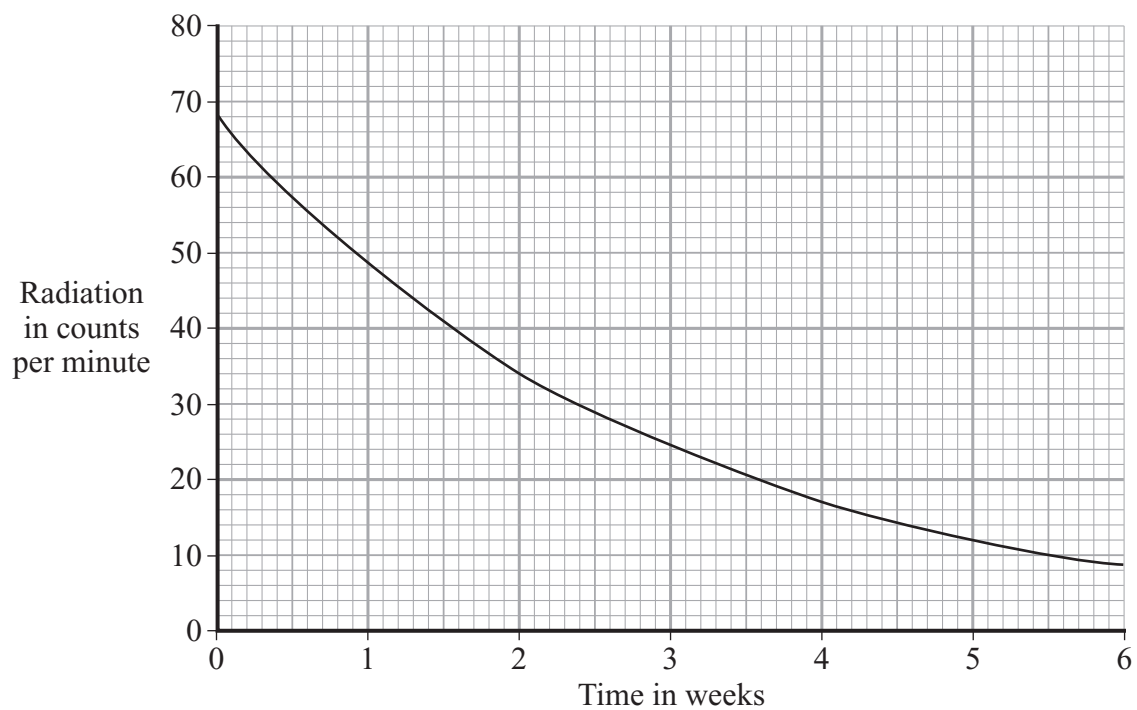
All atoms of an element have the same number of

Isotopes of the same element have different numbers of

(3 marks)

(b) A teacher measured the amount of radiation from a radioactive source, during the same lesson each week, over a period of six weeks.

The results are shown on the graph.



- (i) How long does it take for the radiation to fall from 68 counts per minute to half that value?

Show clearly how you work out your answer.

.....
.....
.....

Time taken for radiation to halve
(3 marks)

- (ii) Complete the sentence.

When an atom of a radioactive element emits alpha radiation, an atom of a different element is formed. A different element is formed because the radioactive element has lost

(1 mark)



TURN OVER FOR THE NEXT QUESTION

Turn over ►

QUESTIONS RELATING TO PREVIOUSLY TESTED MODULES

- 16** (a) 'Life expectancy' is the age to which a person can expect to live.

The table shows the life expectancy, in years, of smokers and of people who have never smoked.

Life expectancy at age	Females who have never smoked	Female smokers	Males who have never smoked	Male smokers
25–29	87.6	80.7	79.7	72.2
30–34	87.7	80.9	80.1	72.7
35–39	87.9	81.1	80.3	73.3
40–44	88.1	81.3	80.7	73.8
45–49	88.3	81.6	81.1	74.5
50–54	88.6	82.0	81.4	75.2
55–59	89.0	83.0	82.0	76.4
60–64	89.5	84.2	83.0	78.1
65–69	90.4	85.4	84.3	79.9
70–74	91.5	87.3	85.7	82.4

- (i) A woman is 43. She has never smoked.

To what age can she expect to live?

.....
(1 mark)

- (ii) What happens to our life expectancy as we get older?

.....
.....
(1 mark)

(iii) Describe, in as much detail as you can, the effect of smoking on the life expectancy of male smokers.

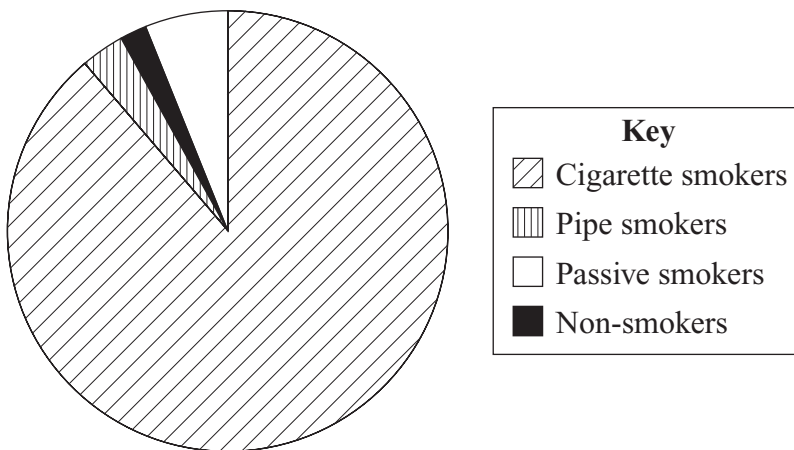
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(3 marks)

(b) The pie chart shows the smoking habits of people who get lung cancer.

‘Passive smokers’ are people who do not smoke, but who live or work with people who do smoke.

People Who Get Lung Cancer



Some people say that this data proves that smoking causes lung cancer.

Others say that it provides evidence for a link between smoking and lung cancer.

Which group is right? Explain the reasons for your answer.

.....
.....
.....
.....

(2 marks)

17 A chemist reacted samples of four different metals:

- first with cold water for a few minutes;
- then with steam.

The table shows the results.

Metal	Reaction with cold water	Reaction with steam
A	Does not react	Does not react
B	Reacts violently	Too dangerous to try
C	Does not react	Reacts slowly
D	Reacts slowly	Reacts quickly

Use the Reactivity Series of Metals on the Data Sheet to answer this question.

Which metal, **A**, **B**, **C** or **D**, was

gold?

iron?

magnesium?

potassium?

(4 marks)

○
—
4

END OF QUESTIONS