

GCSE

Specimen Papers and Mark Schemes

**Edexcel GCSE
Science: Single Award A (1521)**

**For First Examination
Summer 2003**

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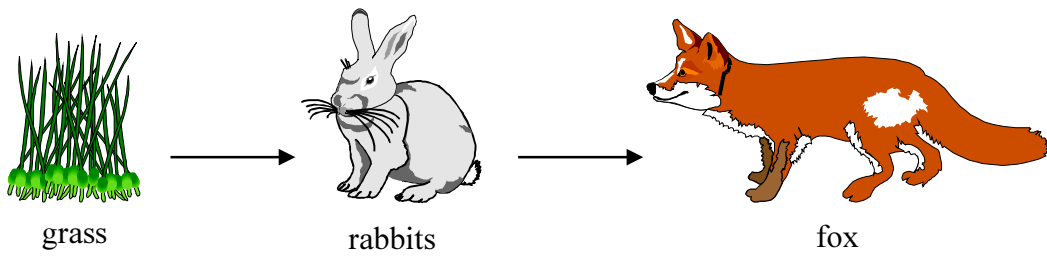
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Contents

Specimen Paper 1F	p 1
Specimen Paper 2F	p 15
Specimen Paper 3F	p 27
Specimen Paper 4H	p 41
Specimen Paper 5H	p 53
Specimen Paper 6H	p 65
Mark Scheme 1F	p 79
Mark Scheme 2F	p 85
Mark Scheme 3F	p 91
Mark Scheme 4H	p 97
Mark Scheme 5H	p103
Mark Scheme 6H	p109
Specification Grid Paper 1F	p114
Specification Grid Paper 2F	p115
Specification Grid Paper 3F	p116
Specification Grid Paper 4H.....	p117
Specification Grid Paper 5H.....	p118
Specification Grid Paper 6H.....	p119

1. The diagram shows a food chain in a field.



There are plans to build a factory on the field.

(a) What will happen to the number of rabbits and foxes if the factory is built?

.....
.....

(1)

(b) Give reasons for your answer.

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

(2)

(Total 3 marks)

2. Use a word or phrase from the box to complete each sentence.

The first one has been done for you.

increases	decreases	stays the same
------------------	------------------	-----------------------

After injecting with a used needle, the chance of getting hepatitis A**increases**.....

After taking an antibiotic, the number of disease-causing microorganisms in the body

After taking heroin, the amount of pain felt

For regular smokers, the chance of developing lung cancer

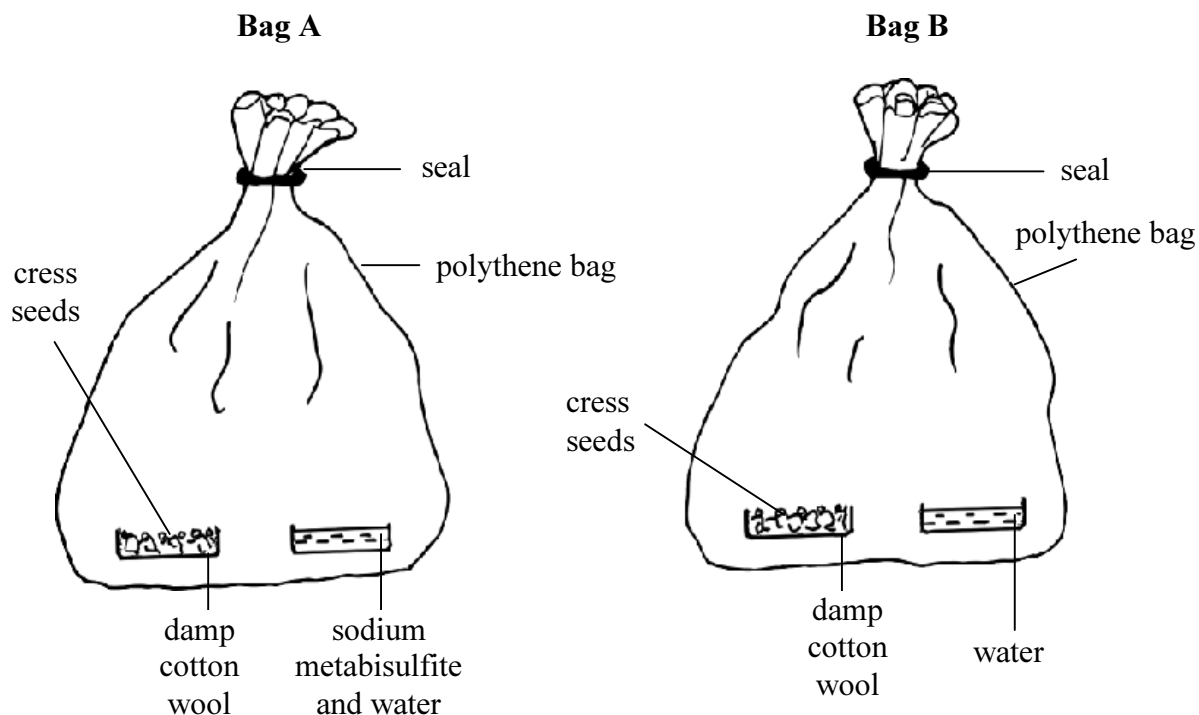
When a person is healthy, the number of white blood cells

(4)

(Total 4 marks)

TURN OVER FOR QUESTION 3

3. Two bags, **A** and **B**, were used to investigate the effect of sulfur dioxide on the germination of cress seeds. The mixture of sodium metabisulfite and water released sulfur dioxide gas slowly in bag **A**.



- (a) Give **one** reason why the bags were sealed.

..... (1)

- (b) What is the purpose of using bag **B**?

..... (1)

- (c) Give **two** conditions that must be kept the same for each bag in this investigation.

1

2

(2)

(d) The table shows the result of the investigation.

	Bag A	Bag B
Number of seeds	20	20
Number of seeds germinated	0	15

(i) What percentage of seeds germinated in bag **B**?

.....
(1)

(ii) What effect did sulfur dioxide have on the germination of cress seeds?

.....
(1)

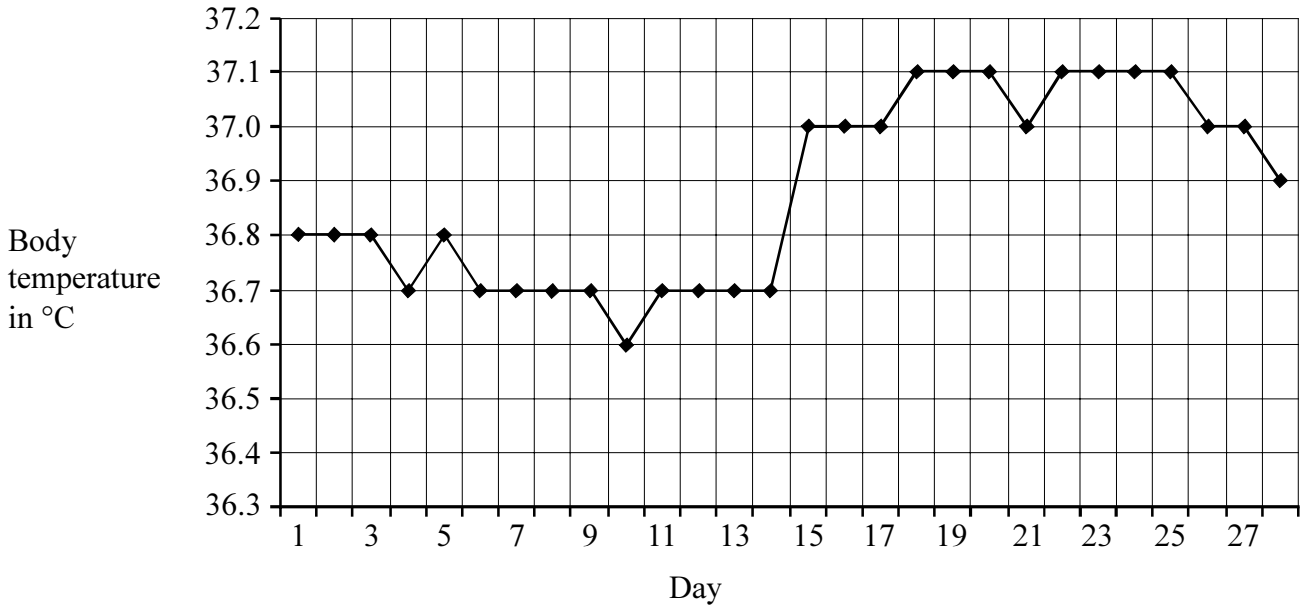
(Total 6 marks)

TURN OVER FOR QUESTION 4

4. For a woman to become pregnant, a sperm must fertilise one of her eggs. Just before an egg is released from an ovary, her body temperature rises slightly.

A woman who wanted to become pregnant measured her body temperature each day for 28 days, starting on the first day of her period.

A graph of her body temperature is shown below.



- (a) (i) What was the body temperature of the woman on day 19?

..... °C
(1)

- (ii) On which day was an egg released from the woman's ovary?

.....
(1)

- (iii) What instrument is used to measure her body temperature?

.....
(1)

(b) During the 28 days, the woman’s ovary released two different hormones, hormone H and progesterone. The table shows some roles of these hormones.

Hormone H	Progesterone
Repairs uterus lining	Maintains uterus lining
Develops secondary sexual characteristics	Prevents release of eggs

(i) Name hormone H.

.....
(1)

(ii) How does hormone H travel from the ovary to the uterus?

.....
(1)

(iii) Give **two** female secondary sexual characteristics.

1

2

(2)

(iv) Why is it important that progesterone maintains the uterus lining during pregnancy?

.....

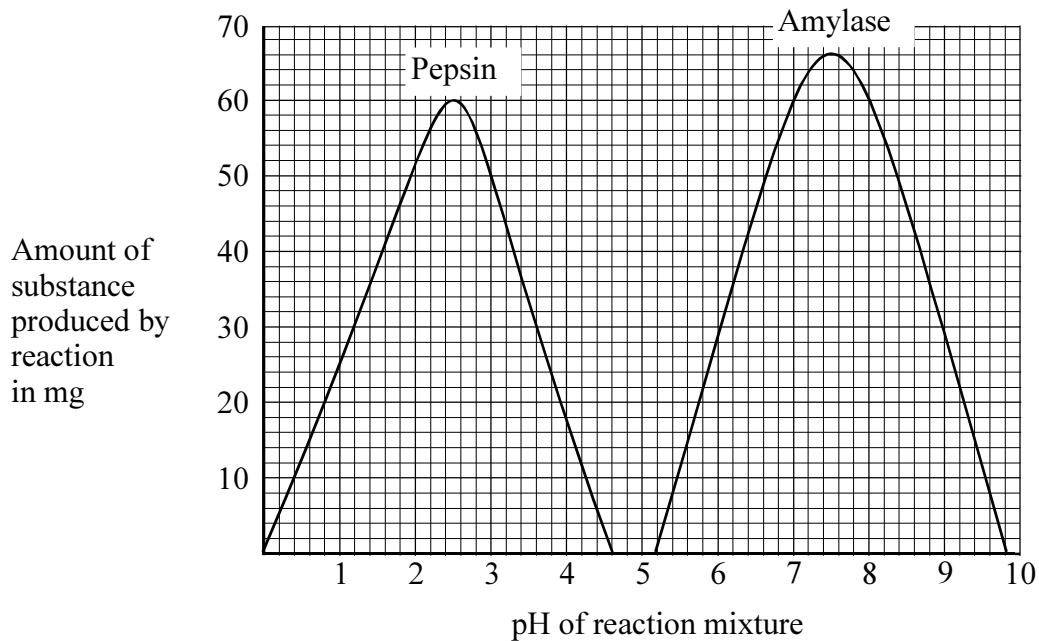
.....

(1)

(Total 8 marks)

TURN OVER FOR QUESTION 5

5. Experiments were carried out to investigate the action of two enzymes at different pH values. The enzymes were amylase and pepsin (a protease). All experiments were carried out at 37 °C for 20 minutes. The results are shown on the graph below.



(a) How much substance was produced in the pepsin-controlled reaction at pH3?

.....mg
(1)

(b) At which pH values were 60 mg of substance produced by:

(i) pepsin.....
(1)

(ii) Draw a line on the grid to show what you would expect the result to be with amylase at 37 °C for 10 minutes.
(2)

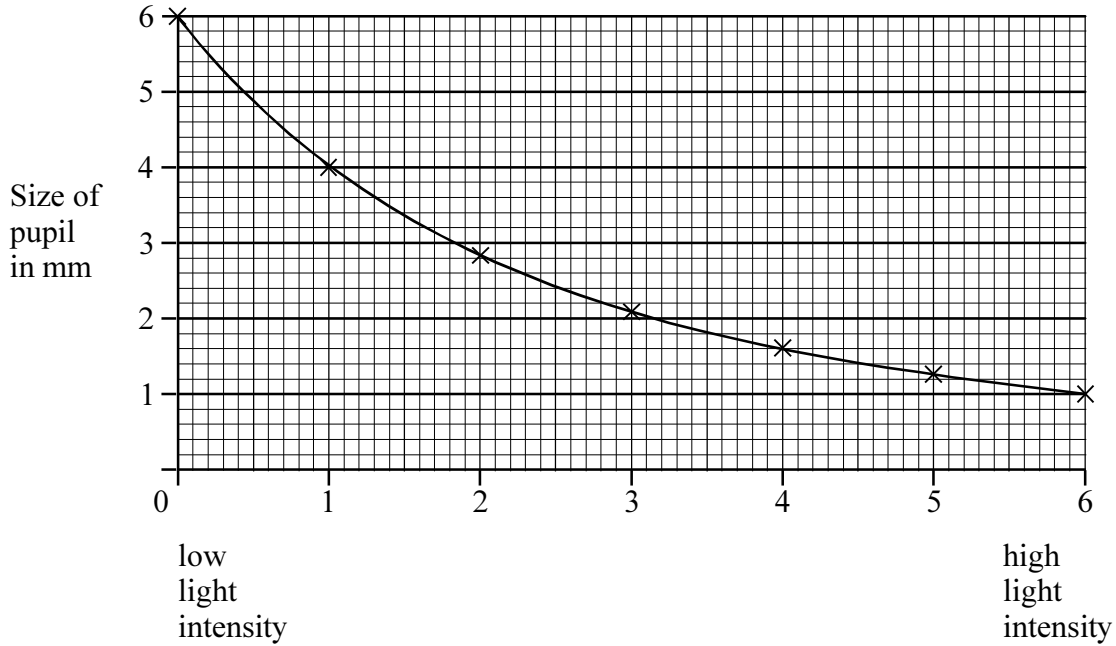
(c) Which substance is produced when:

(i) pepsin acts on protein:
.....
(1)

(ii) amylase acts on starch?
.....
(1)

(Total 6 marks)

6. The graph shows the size of the pupil in a student's eye in different light intensities.



(a) Use the graph to answer the questions below.

(i) How many readings were taken to produce the data for the graph?

.....
(1)

(ii) What was the size of the pupil at a light intensity of 6?

Answer.....mm
(1)

(iii) How does the size of the pupil vary with the light intensity?

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

(b) Use words from the box to complete the passage.

brain	iris	muscle	optic	retina
--------------	-------------	---------------	--------------	---------------

Light is detected by cells in the An electrical impulse is then sent to the along the nerve. Another impulse is then sent to the tissue of the

(5)

(Total 9 marks)

7. Two samples of blood were tested in a hospital laboratory. One sample was from a healthy patient, and one from someone with leukaemia. A microscope was used to help count the number of red and white blood cells in each sample. The table shows the results.

Type of blood cell	Number of cells in 1mm ³ of blood from a healthy patient	Number of cells in 1mm ³ of blood from someone with leukaemia
red	500,000	200,000
white	10,000	100,000

- (a) How does the blood of the healthy patient differ from the blood of someone with leukaemia?

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

(2)

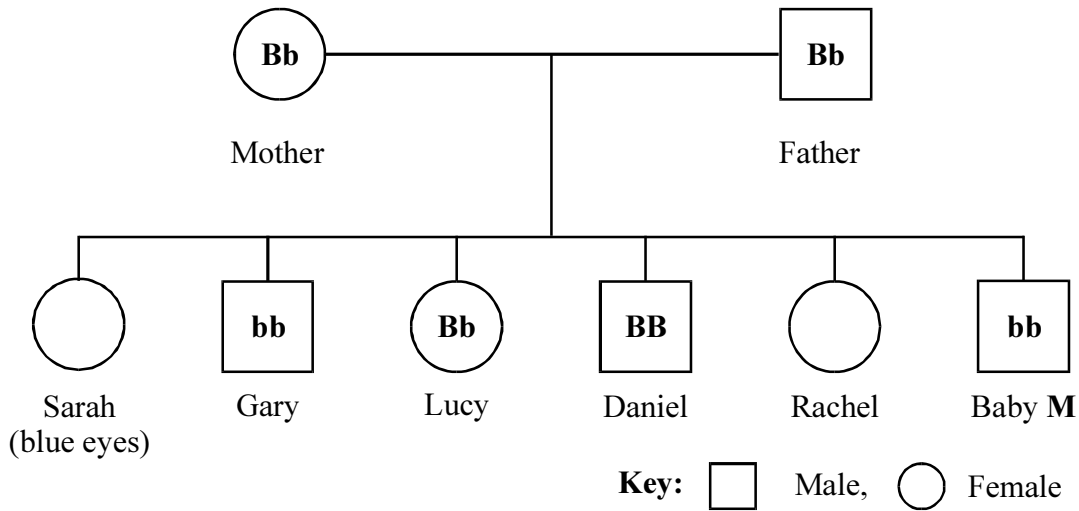
- (b) Suggest why someone with leukaemia feels tired.

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

(2)

(Total 4 marks)

8. The diagram below shows the inheritance of eye colour in a family. The allele for brown eyes is dominant (**B**) and the allele for blue eyes is recessive (**b**).



(a) Which of the following statements is true?

- A** Lucy and Daniel both have blue eyes
- B** Lucy and Daniel have different coloured eyes
- C** Lucy and Daniel have the same coloured eyes
- D** All the males in the family have brown eyes

Write the correct answer (**A**, **B**, **C** or **D**) in the box.

(1)

(b) (i) What is the sex and eye colour of baby **M**?

.....

(2)

(ii) How was the sex of baby **M** determined at fertilisation?

.....

.....

(2)

(c) In the family shown, Rachel has an identical twin. Rachel has brown eyes.

(i) Who is Rachel's identical twin?.....

(1)

(ii) Explain how you decided on your answer.

.....

.....

.....

(2)

(Total 8 marks)

9. The passage below is about Charles Darwin.

Who Inspired Darwin?

Thomas Malthus lived in the early 19th century. He wrote ‘An Essay on the Principle of Population.’ In this essay he pointed out that human beings produce far more offspring than ever survive. However, the adult population tends to remain stable from generation to generation.

Darwin realised that this idea applies to other animals. For example, one fish, which lays thousands of eggs in a year, would over-populate an area with its offspring if they all survived.

The work of Malthus helped Darwin to develop his own ideas of how a species changes. He produced his theory of natural selection. Darwin realised that there must be a reason why some offspring survived but others did not. He suggested that small variations between individuals of a species might give certain individuals a better chance of survival. For example, those organisms with characteristics that made them better at escaping from predators or finding food would have a better chance of survival.

(a) (i) What is meant by the phrase “the adult population tends to remain stable from generation to generation”?

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

(2)

(ii) Suggest why fish lay thousands of eggs rather than just a few.

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

(2)

(iii) What can cause “small variations between individuals of a species”?

.....
.....

(1)

(iv) What is meant by the phrase **natural selection**?



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

(4)

(b) Here are four statements about evolution. Tick the box beside the statement that is false.

The theory of evolution was developed by Darwin

DNA is the genetic material that transfers information from generation to generation

Acquired characteristics **cannot** be passed on from parent to offspring

Nature plays an important part in artificial selection

(1)

(c) Suggest **two** ways that scientists can let other groups of scientists know about their ideas.

1

2

(2)

(Total 12 marks)

TOTAL MARK 60

END

THE PERIODIC TABLE

		Group																																			
		1	2											3	4	5	6	7	8																		
Period	1																																				
1		<table border="1" style="margin: auto;"> <tr><td>1</td></tr> <tr><td>H</td></tr> <tr><td>Hydrogen</td></tr> <tr><td>1</td></tr> </table>										1	H	Hydrogen	1	<table border="1" style="margin: auto;"> <tr><td>4</td></tr> <tr><td>He</td></tr> <tr><td>Helium</td></tr> <tr><td>2</td></tr> </table>						4	He	Helium	2												
1																																					
H																																					
Hydrogen																																					
1																																					
4																																					
He																																					
Helium																																					
2																																					
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87	88	89																																			

Key

Relative atomic mass
Symbol
Name
Atomic number

1. (a) Use the periodic table to give:
- (i) the symbol for an atom of sulfur; (1)
 - (ii) an element in the same group as sodium; (1)
 - (iii) an element in group 2; (1)
 - (iv) an element in group 6; (1)
 - (v) the atomic number of neon; (1)
 - (vi) an element in period 2. (1)

(b) Elements in the periodic table are classified as metals or non-metals.

Give the names of **two** non-metallic elements.

1

2

(2)

(Total 8 marks)

TURN OVER FOR QUESTION 2

2. (a) Circle the correct formula for each of the following gases.

water vapour HO H₂O HO₂

nitrogen N N₂ N₃

methane CH CH₂ CH₄

carbon monoxide CO C₂O CO₂

(4)

(b) Describe a test for carbon dioxide.

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

(2)

(c) Write the chemical formula, with state symbol, for carbon dioxide gas.

.....

(2)

(Total 8 marks)

3. A small piece of sodium is dropped into a large beaker of water. It reacts to form sodium hydroxide solution and a gas.

(a) Describe **three** things you would **see** in this experiment.



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

(4)

(b) Give the name of the gas formed by this reaction.

.....

(1)

(c) Sodium hydroxide solution has a pH of 14.

Complete the sentence using a word from the box.

acidic alkaline neutral
--

Sodium hydroxide solution is

(1)

(Total 6 marks)

TURN OVER FOR QUESTION 4

4. The table gives information about four hydrocarbons.

Name of hydrocarbon	Number of carbon atoms in one molecule	Boiling point (°C)
ethane	2	-90
propane	3	-40
butane	4	0
hexane	6	+70

(a) (i) Which element, other than carbon, is present in hydrocarbons?

.....
(1)

(ii) Which of these hydrocarbons has the lowest boiling point?

.....
(1)

(iii) Which of these hydrocarbons has the biggest molecules?

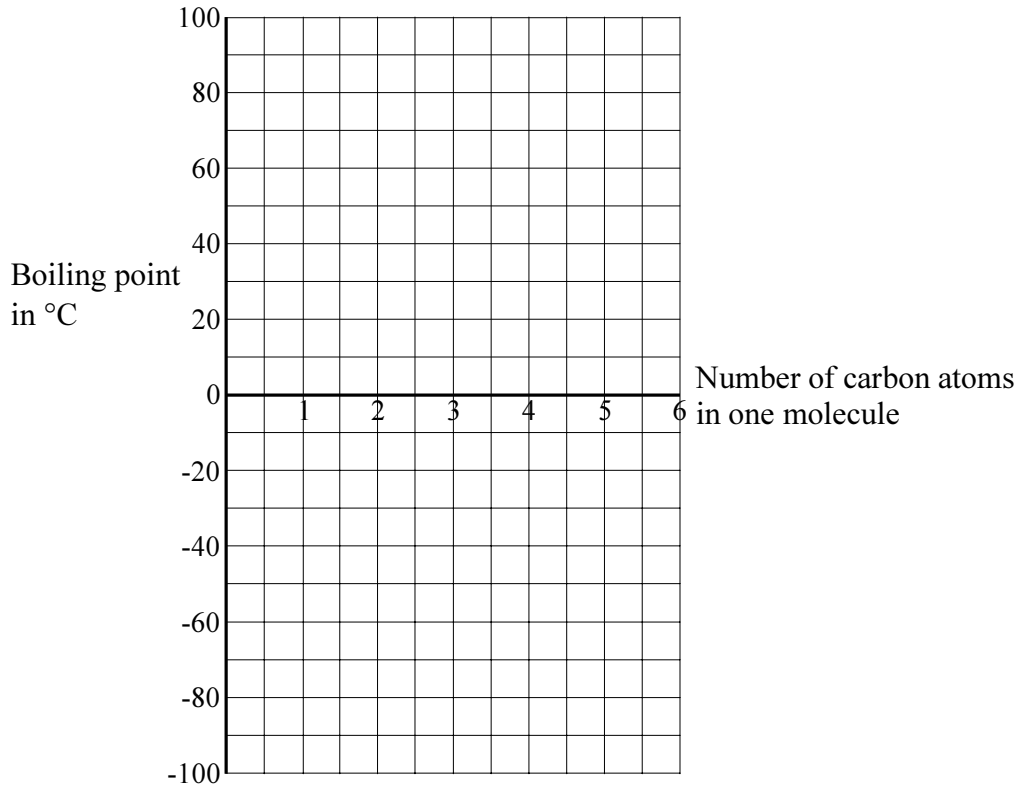
.....
(1)

(iv) Which of these hydrocarbons has molecules with the structure

$$\begin{array}{ccccccc}
 & \text{H} & \text{H} & \text{H} & & & \\
 & | & | & | & & & \\
 \text{H} & - \text{C} & - \text{C} & - \text{C} & - \text{H} & ? & \\
 & | & | & | & & & \\
 & \text{H} & \text{H} & \text{H} & & &
 \end{array}$$

.....
(1)

(b) (i) Use the information in the table opposite to draw a graph on the grid.



(3)

(ii) Pentane is a hydrocarbon with five carbon atoms in each molecule. Use your graph to estimate the boiling point of pentane.

..... °C
(1)

(c) Some of these hydrocarbons are present in petroleum gas which is obtained from crude oil.

(i) Name the process used to separate petroleum gas from crude oil.

.....
(2)

(ii) Name **two** other fuels obtained from crude oil by this process.

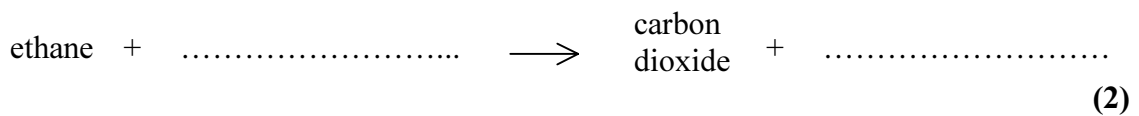
1

2

(2)

(d) Ethane gas burns in air.

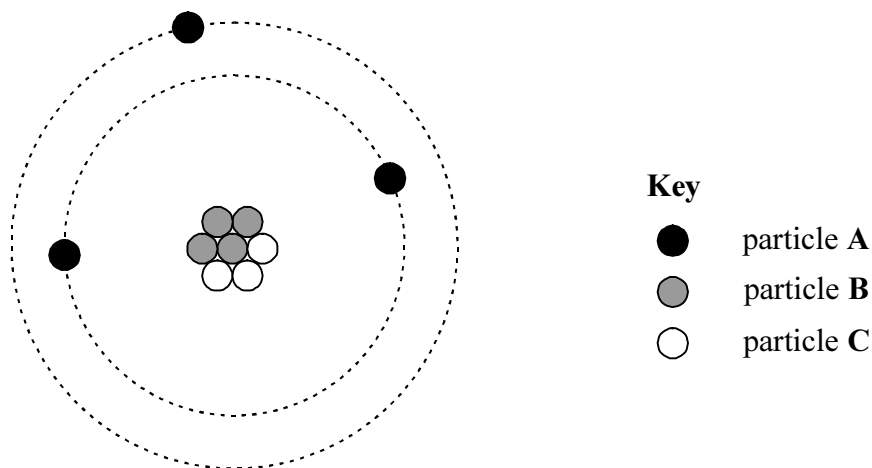
Complete the word equation for this reaction.



(2)

(Total 14 marks)

5. (a) The diagram shows the arrangement of particles in an atom of the element lithium.



(i) Identify the particles **A**, **B** and **C**.

Particle **A**

Particle **B**

Particle **C**

(3)

(ii) What is the mass number of the atom in the diagram?

.....

(1)

(iii) Use the diagram to explain why this element is in group 1 of the periodic table.

.....

.....

(1)

(b) Another element in group 1 is sodium.

Sodium reacts with chlorine (Cl_2) to form sodium chloride (NaCl).

Write a balanced equation for this reaction.

.....

(2)

(Total 7 marks)

6. (a) Use the periodic table provided to give the electronic structure of a chlorine atom and a chloride ion.

chlorine atom	chloride ion

(4)

- (b) Hydrogen chloride is a covalent compound containing hydrogen chloride molecules. Explain how a hydrogen atom and a chlorine atom form a covalent bond.

.....

.....

.....

.....

(2)

- (c) Hydrogen chloride can be converted into sodium chloride as shown below.

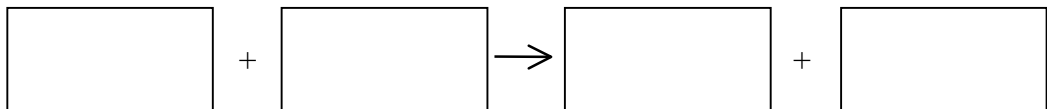


- (i) How is hydrogen chloride converted to hydrochloric acid?

.....

(2)

- (ii) Write the word equation for the neutralisation of hydrochloric acid to form sodium chloride.



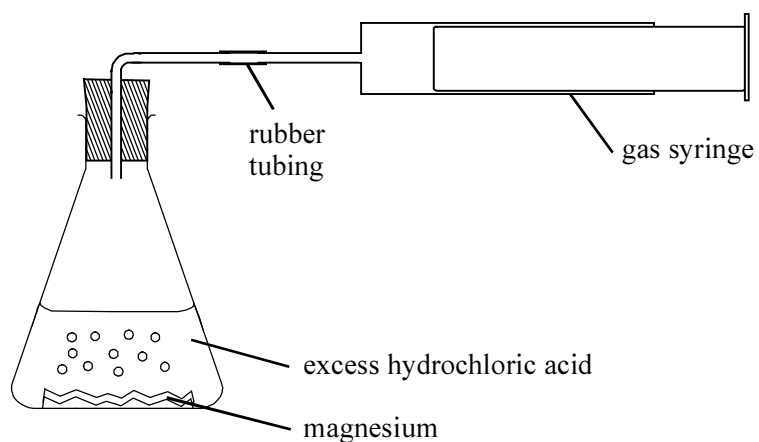
(2)

(Total 10 marks)

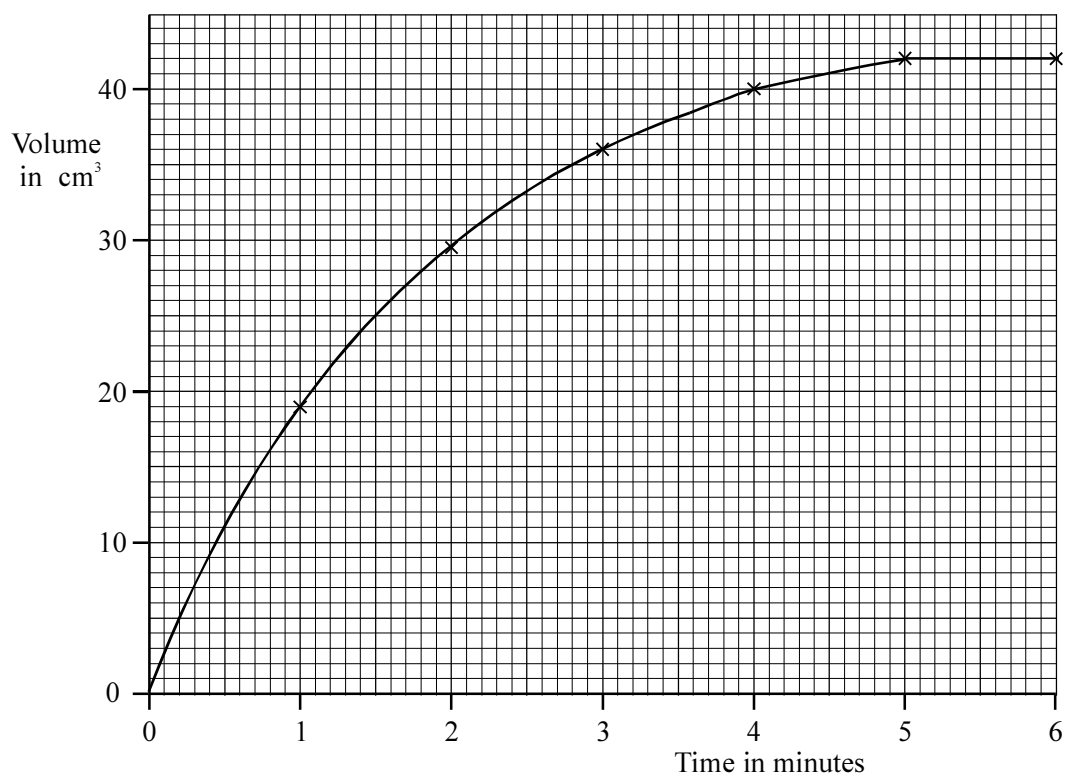
TURN OVER FOR QUESTION 7

7. Magnesium ribbon reacts with hydrochloric acid to produce hydrogen.

A student used an excess of hydrochloric acid in the apparatus below to investigate this reaction.



His results are shown on the graph.



(a) What volume of gas was in the syringe at the end of the reaction?

.....

(1)

- (b) State how the rate of reaction changes during the first **four** minutes and explain the change.

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

(2)

- (c) The experiment was repeated using the same quantities of reagents but with the acid at a higher temperature.

Draw on the graph the line that should be obtained at this temperature.

(2)

- (d) Some power stations burn coal in the production of electricity. The coal is ground to a fine powder before being burned in the furnace.

Use your knowledge of rates of reaction to suggest why the coal is ground to a fine powder rather than used in large lumps.

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

(2)

(Total 7 marks)

TOTAL MARKS 60

END

1. The table shows some data about the planets of the Sun.

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

Use information from the table to answer the following questions.

(a) Which planet takes the longest time to go round the Sun?

.....
(1)

(b) Use words from the box to complete the paragraph.

decreases	Earth	heat	increases	light	Pluto
------------------	--------------	-------------	------------------	--------------	--------------

The planet has the lowest surface temperature. This is because lessenergy arrives at the surface of a planet as the distance from the Sun

(3)

(c) Pluto is mainly gas.
How can we tell this from the table?

.....
(1)

(d) (i) What information suggests that Jupiter has the largest mass?

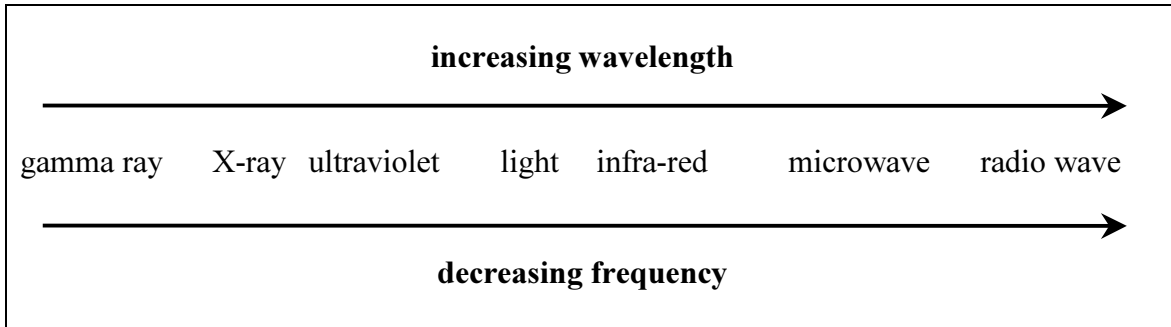
.....
(1)

(ii) On which planet would you have the least weight?

.....
(1)

(Total 7 marks)

2. The diagram shows the waves that make up the electromagnetic spectrum.



(a) In going from light to radio waves, describe how:

(i) the wavelength changes;.....

.....

(ii) the frequency changes.

.....

(2)

(b) Which **two** waves in the spectrum are most harmful to humans?

1

2

(2)

(c) Choose **one** of the waves shown in the diagram.

Name **one** use for the wave that you choose and describe how it is used.

Wave.....

Use.....

Description of use.....

.....

.....

(3)

(Total 7 marks)

TURN OVER FOR QUESTION 3

3. (a) The table shows the power rating and operating current for a number of household electrical appliances.

Appliance	Power (watt)	Current (ampere)
cooker	6000	25.0
iron	960	4.0
food mixer	480	2.0
television	180	0.75
table lamp	60	0.25

Leave
blank

- (i) Which appliance costs most to run for an hour?

Give a reason for your answer.

Appliance.....

Reason

.....

(2)

- (ii) Each of the appliances listed uses 240 volts.

Explain why the cooker has the smallest resistance of these appliances.

.....

.....

.....

.....

(2)

(iii) A cooker is always on a separate circuit with a thick cable.

Tick the two boxes to show the reasons for this.

Thick cables have a lower resistance.

Thick cables are easy to insulate.

Thick cables melt at a higher temperature.

Thick cables produce less heat.

(2)

(b) Electrical lighting in a house uses parallel circuits instead of series circuits.

State **two** reasons why parallel circuits are used for domestic lighting circuits.

1.

.....

2.

.....

(2)

(Total 8 marks)

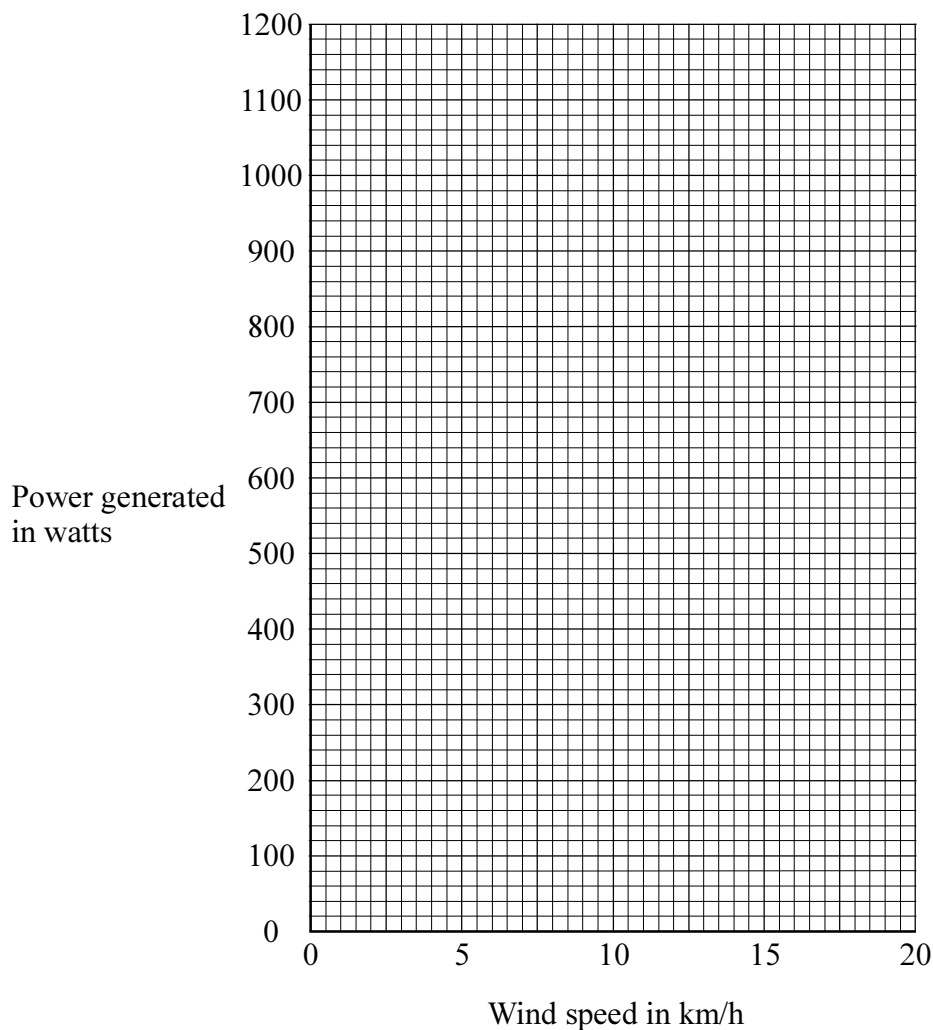
TURN OVER FOR QUESTION 4

Leave blank

4. (a) A wind powered generator is used to produce electrical power when the wind is blowing. The table shows the electrical power generated by the wind for different wind speeds.

Power generated (watts)	0	0	140	900	1100	1160	1160
Wind speed (km/h)	0	2	5	10	12	15	20

- (i) On the axes below draw a graph to show how the power generated changes with wind speed.



(3)

(ii) What is the lowest wind speed needed to generate power?

.....
(1)

(iii) What is the maximum power generated by the wind?

.....
(1)

(iv) Explain **one** disadvantage of using only a wind generator as the source of electrical power.

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

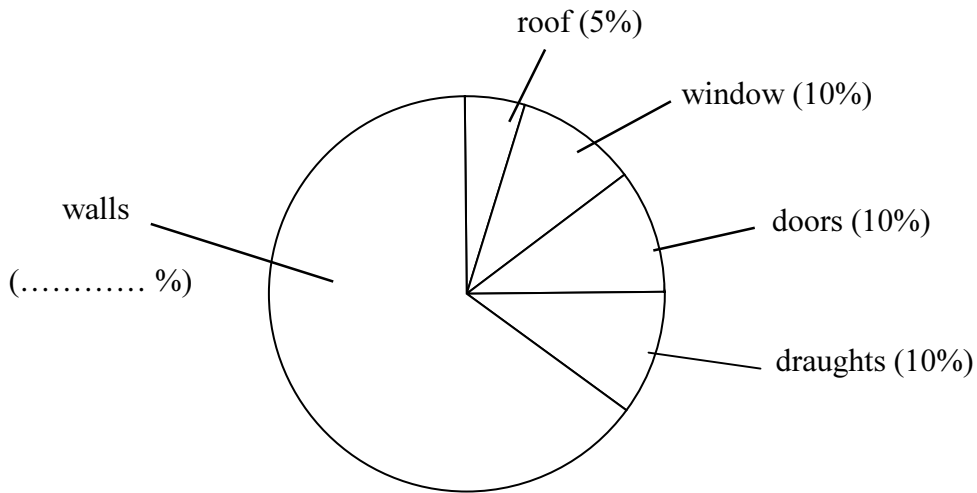
(b) Complete the sentence to show the energy transfer taking place in the wind powered generator.

..... energy is transferred to energy.
(2)

(Total 8 marks)

TURN OVER FOR QUESTION 5

5. (a) The main heat energy losses from a house are shown in the diagram.



(i) Complete the diagram to show the percentage heat energy loss through the walls.

(1)

(ii) Complete the table below to show how the heat energy loss from each part of the house can be reduced. The first one has been done for you.

Part of the house	Method used for reducing heat energy loss
roof	glass-fibre insulation in the loft
walls	..........
floor	..........

(2)

- (b) Double glazing is used to reduce the heat energy loss from houses through the windows. The table compares the heat loss for ordinary windows and for double glazed windows.

Type of window	Heat energy passing through (joules per second)
ordinary window	224
double-glazed window	116

The size of the windows and the temperature inside and outside the house are the same in each case.

- (i) How many joules per second does using double glazing save?

.....
(1)

- (ii) How much energy would pass through an ordinary window in one hour?

.....
.....
..... joules
(3)

- (c) A double glazing salesman claims that by replacing ordinary windows with double glazed windows, the heating bills of a house will be halved.

Use the information given earlier to show whether this claim is true or not.



.....
.....
.....
.....
.....
.....
.....
(3)

(Total 10 marks)

TURN OVER FOR QUESTION 6

6. Radon is a radioactive gas. It escapes from underground rocks and causes a large part of the natural background radiation in the United Kingdom.

*Leave
blank*

(a) Radon-220 (${}^{220}_{86}\text{Rn}$) is an isotope of radon.

(i) How many protons are there in a nucleus of radon-220?

.....
(1)

(ii) How many neutrons are there in a nucleus of radon-220?

.....
(1)

(iii) Explain what is meant by the statement: "This element has three isotopes".

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

- (b) • Radon-220 has a short half-life and emits α -particles.
- Alpha particles are easily stopped by material and only travel a short distance in air.
- Radon gas is thought to produce harmful effects.

When home owners, in areas where radon gas is produced, were told of the risks, very few took notice.

(i) Explain why the presence of radon gas in buildings is a health hazard.

.....

.....

.....

.....

.....

.....

(3)

(ii) Discuss why, you think, so few people took any action to reduce the risks due to radon gas.



.....

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.....

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.....

.....

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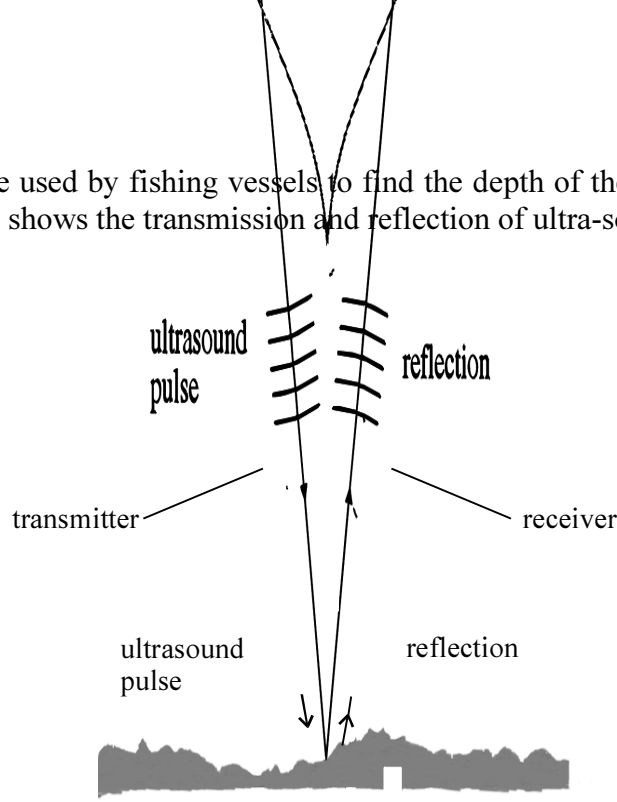
(4)

(Total 11 marks)

TURN OVER FOR QUESTION 7

7. Ultrasound can be used by fishing vessels to find the depth of the sea or to locate shoals of fish. The diagram shows the transmission and reflection of ultra-sound from a fishing vessel.

Leave blank



- (a) What is ultrasound?

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

(2)

- (b) Waves with small wavelengths spread out (diffract) less than those with long wavelengths. Use this information to suggest why ultrasound is much better than ordinary sound for finding the depth of the sea.

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

(3)

(Total 5 marks)

8. Optical fibres are used to carry information. The information is carried by the light beam in the form of a digital signal.

(a) Draw a diagram to show what is meant by a digital signal.

(1)

(b) The signal from a microphone is an analogue signal. How does an analogue signal differ from a digital signal?

.....
.....

(1)

(c) When signals are sent through optical fibres they lose energy.

(i) State what happens to the brightness of the light beam as it loses energy.

.....

(1)

(ii) State **one** disadvantage of losing energy as the light beam travels through the optical fibre.

.....
.....

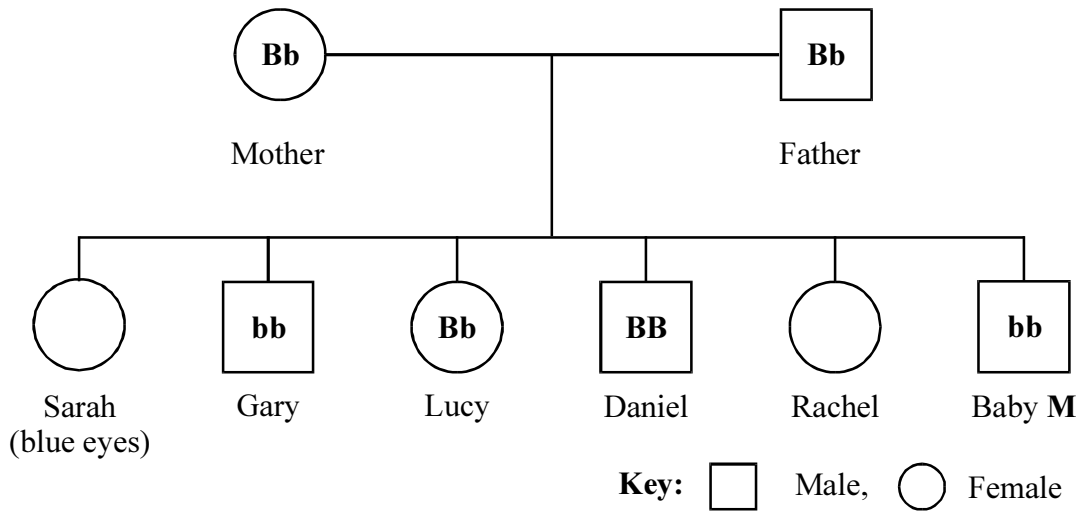
(1)

(Total 4 marks)

TOTAL MARK 60

END

1. The diagram below shows the inheritance of eye colour in a family. The allele for brown eyes is dominant (**B**) and the allele for blue eyes is recessive (**b**).



- (a) Which of the following statements is true?
- A** Lucy and Daniel both have blue eyes
 - B** Lucy and Daniel have different coloured eyes
 - C** Lucy and Daniel have the same coloured eyes
 - D** All the males in the family have brown eyes

Write the correct answer (**A**, **B**, **C** or **D**) in the box.

(1)

- (b) (i) What is the sex and eye colour of baby **M**?

.....

(2)

- (ii) How was the sex of baby **M** determined at fertilisation?

.....

.....

.....

(2)

- (c) Daniel's genotype is **BB**.
What is Sarah's genotype?

.....

(1)

(d) In the family shown, Rachel has an identical twin. Rachel has brown eyes.

(i) Who is Rachel's identical twin?.....

(1)

(ii) Explain how you decided on your answer.

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

(2)

(Total 9 marks)

2. Two samples of blood were tested in a hospital laboratory. One sample was from a healthy patient, and one from someone with leukaemia. A microscope was used to help count the number of red and white blood cells in each sample. The table shows the results.

Type of blood cell	Number of cells in 1mm ³ of blood from a healthy patient	Number of cells in 1mm ³ of blood from someone with leukaemia
red	500,000	200,000
white	10,000	100,000

(c) How does the blood of the healthy patient differ from the blood of someone with leukaemia?

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

(2)

(d) Suggest why someone with leukaemia feels tired.

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

(2)

(Total 4 marks)

3. The passage below is about Charles Darwin.

*Leave
blank*

Who Inspired Darwin?

Thomas Malthus lived in the early 19th century. He wrote ‘An Essay on the Principle of Population.’ In this essay he pointed out that human beings produce far more offspring than ever survive. However, the adult population tends to remain stable from generation to generation.

Darwin realised that this idea applies to other animals. For example, one fish, which lays thousands of eggs in a year, would over-populate an area with its offspring if they all survived.

The work of Malthus helped Darwin to develop his own ideas of how a species changes. He produced his theory of natural selection. Darwin realised that there must be a reason why some offspring survived but others did not. He suggested that small variations between individuals of a species might give certain individuals a better chance of survival. For example, those organisms with characteristics that made them better at escaping from predators or finding food would have a better chance of survival.

(a) (i) What is meant by the phrase “the adult population tends to remain stable from generation to generation”?

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

(2)

(ii) Suggest why fish lay thousands of eggs rather than just a few.

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

(2)

(iii) What can cause “small variations between individuals of a species”?

.....
.....

(1)

(iv) What is meant by the phrase **natural selection**?



.....

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.....

.....

(4)

(b) Here are four statements about evolution. Tick the box beside the statement that is false.

- The theory of evolution was developed by Darwin

- DNA is the genetic material that transfers information from generation to generation

- Acquired characteristics **cannot** be passed on from parent to offspring

- Nature plays an important part in artificial selection

(1)

(c) Suggest **two** ways that scientists can let other groups of scientists know about their ideas.

1

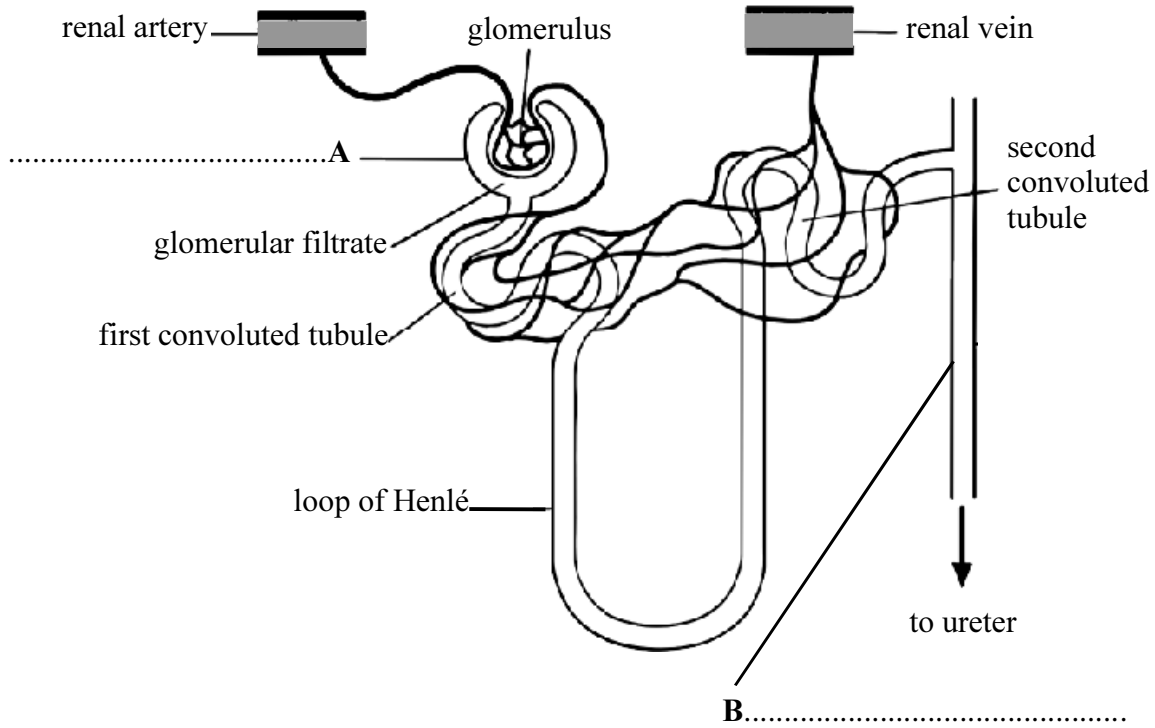
2

(2)

(Total 12 marks)

TURN OVER FOR QUESTION 4

4. The diagram shows a kidney nephron.



(a) Label **A** and **B**.

(2)

(b) Place an **X** on the diagram where ultrafiltration takes place.

(1)

(c) Blood is filtered as it passes through a kidney.

Complete the table by putting ticks in boxes to show where each substance can be found in a healthy person.

Substance	Found in			
	blood	filtrate in first convoluted tubule	filtrate in second convoluted tubule	urine
protein				
water				
urea				
glucose				

(4)

(Total 7 marks)

5. Read the passage and answer the questions that follow.

Young people who go clubbing lose a lot of water as sweat while they dance. This makes them very thirsty, so they drink a lot of water. Some of them also take tablets called *Ecstasy*. *Ecstasy* stimulates release of the hormone ADH. Young people who dance a lot and take *Ecstasy* have very dilute blood plasma. When blood passes through the brain, the brain cells swell and press against the inside of the skull. The pressure on the brain cells causes damage, which can be fatal.

(a) Explain why it is important that young people sweat when dancing.

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

(2)

(b) (i) Name the organ that releases ADH.

.....

(1)

(ii) Which organ does ADH target?

.....

(1)

(iii) How does ADH travel from where it is released to the organ it targets?

.....

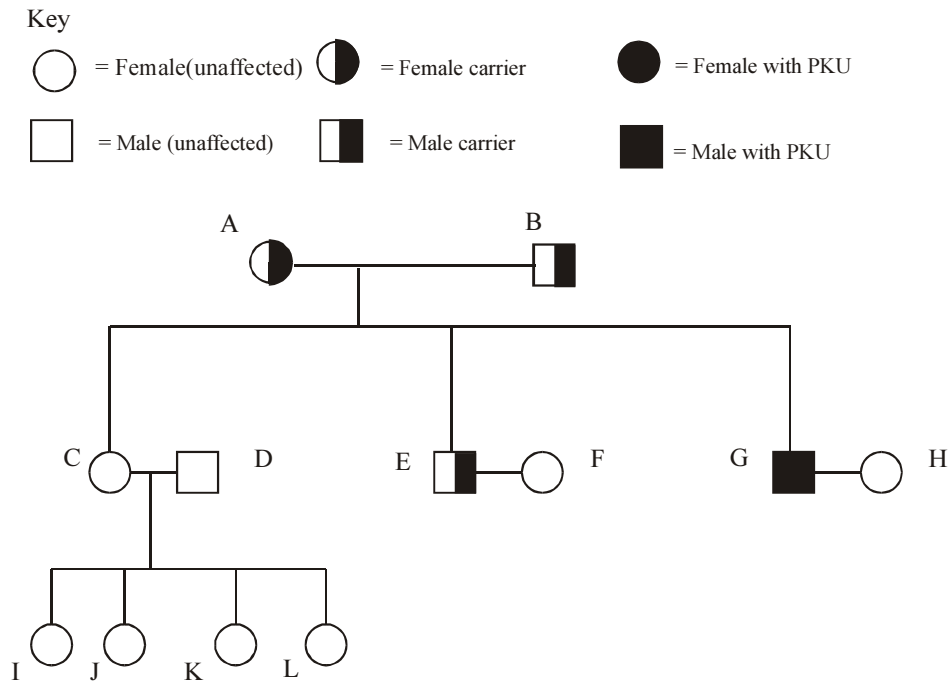
(1)

(Total 5 marks)

TURN OVER FOR QUESTION 6

6. PKU (phenylketonuria) is an inherited disease. The allele (n) for the disease is recessive to the normal allele (N).

The diagram shows how PKU was inherited in a family.



- (a) Give the genotype of each individual in the table below.

Individual	Genotype
B	
J	

(2)

- (b) How many of the children of A and B are homozygous?

.....

(1)

- (c) If G and H have a child, what is the probability that it will have PKU?

.....

(1)

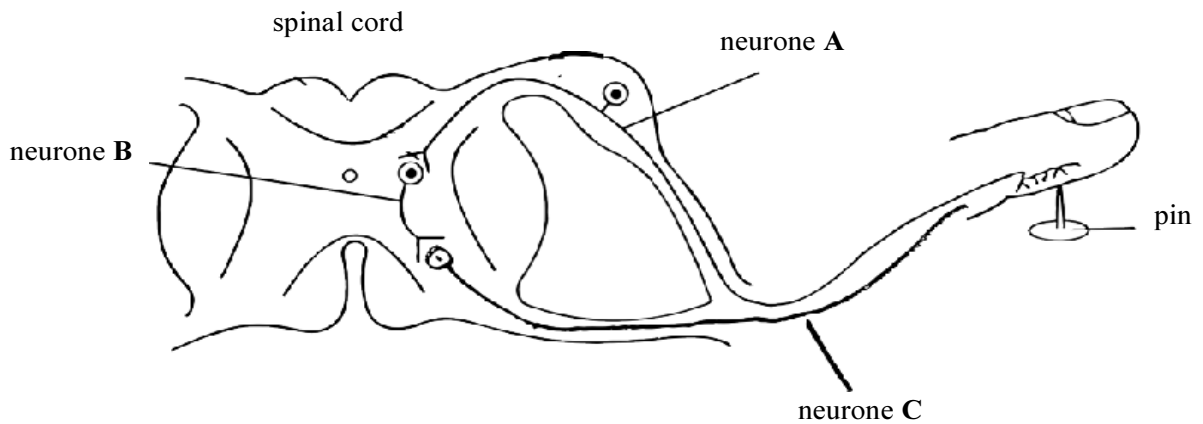
- (d) C and D have four children, all of whom are female. What is the probability that their next child will be female?

.....

(1)

(Total 5 marks)

7. The diagram shows part of a finger and a reflex arc.



(a) (i) Name the type of neurone labelled **B** in the diagram.

.....
(1)

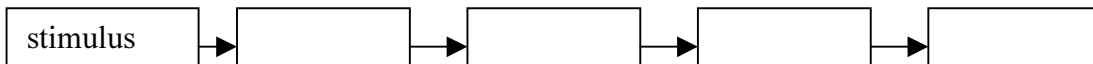
(ii) Describe how nerve impulses are passed from neurone **A** to neurone **B**.

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

(b) The words below are used to describe the pathway which involves nerve impulses during a reflex action.

effector	neurones	receptor	response	stimulus
-----------------	-----------------	-----------------	-----------------	-----------------

Complete the pathway using these words.

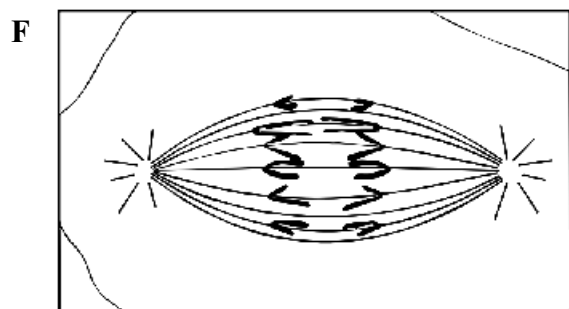
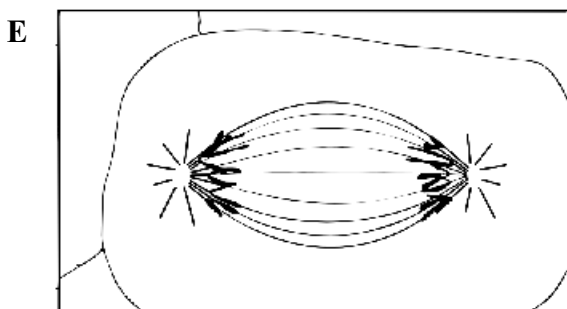
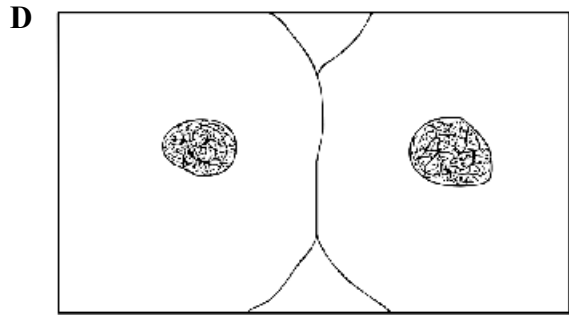
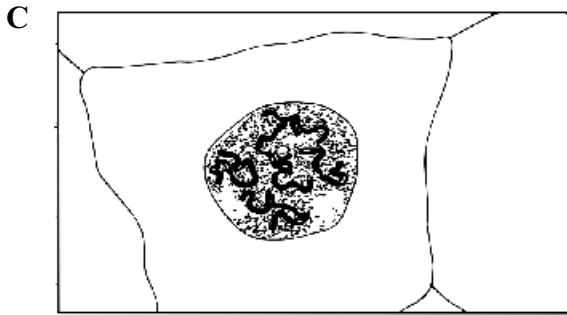
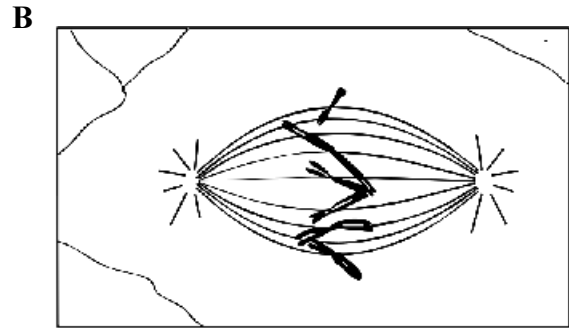
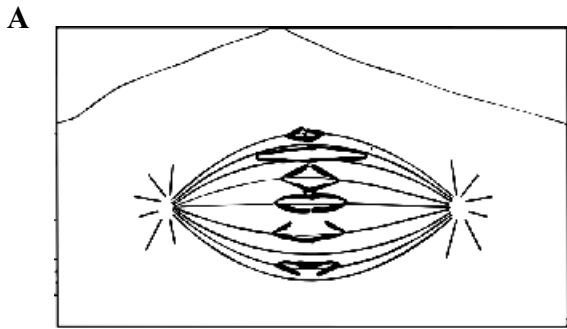


(3)

(Total 6 marks)

TURN OVER FOR QUESTION 8

8. The diagrams A, B, C, D, E and F show an animal cell at different stages of mitosis.



- (a) Use the letter by each diagram to arrange these stages in the correct order. Write your answers in the table. The first and last stages have been done for you. Write **one** letter only in each box.

Stage in mitosis	Label letter
First stage	C
Second stage	
Third stage	
Fourth stage	
Fifth stage	
Sixth stage	D

(3)

- (b) What is the diploid chromosome number of this cell?

.....

(1)

- (c) Give **two** ways in which meiosis differs from mitosis.

1

.....

2

.....

(2)

(Total 6 marks)

TURN OVER FOR QUESTION 9

9. How does air pollution affect the environment?



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(6)

(Total 6 marks)

TOTAL MARK 60

END

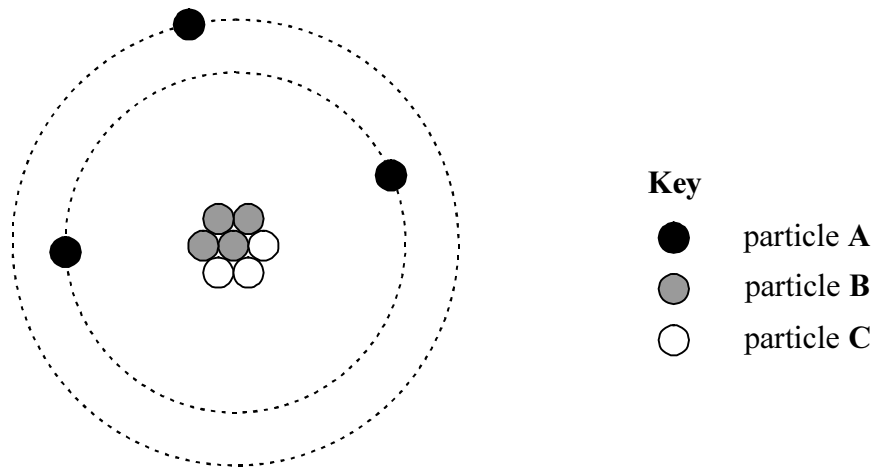
THE PERIODIC TABLE

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Key

Relative atomic mass
Symbol
Name
Atomic number

1. (a) The diagram shows the arrangement of particles in an atom of the element lithium.



(i) Identify the particles **A**, **B** and **C**.

Particle **A**

Particle **B**

Particle **C**

(3)

(ii) What is the mass number of the atom in the diagram?

.....

(1)

(iii) Use the diagram to explain why this element is in group 1 of the periodic table.

.....

.....

(1)

(b) Another element in group 1 is sodium.

Sodium reacts with chlorine (Cl_2) to form sodium chloride (NaCl).

Write a balanced equation for this reaction.

.....

(2)

(Total 7 marks)

TURN OVER FOR QUESTION 2

BLANK PAGE

2. (a) Use the periodic table provided to give the electronic structure of a chlorine atom and a chloride ion.

chlorine atom	chloride ion

(4)

- (b) Hydrogen chloride is a covalent compound containing hydrogen chloride molecules. Explain how a hydrogen atom and a chlorine atom form a covalent bond.

.....

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.....

(2)

- (c) Hydrogen chloride can be converted into sodium chloride as shown below.

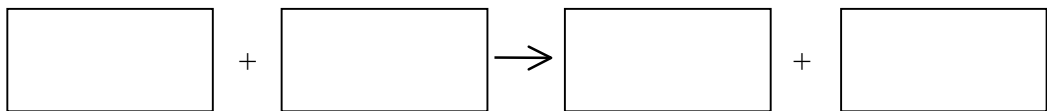


- (i) How is hydrogen chloride converted to hydrochloric acid?

.....

(2)

- (ii) Write the word equation for the neutralisation of hydrochloric acid to form sodium chloride.



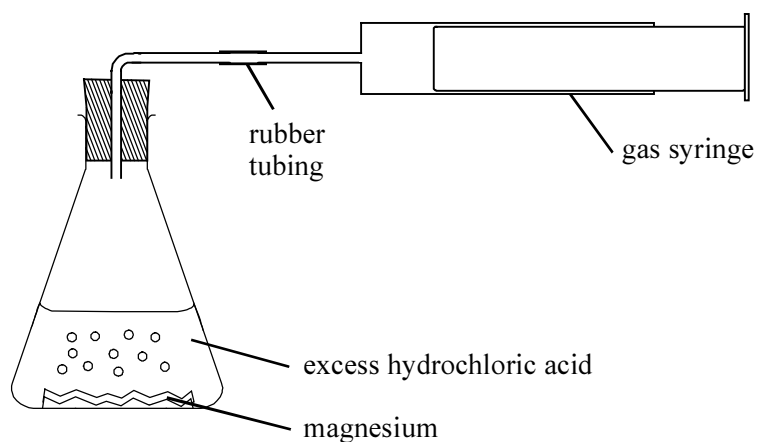
(2)

(Total 10 marks)

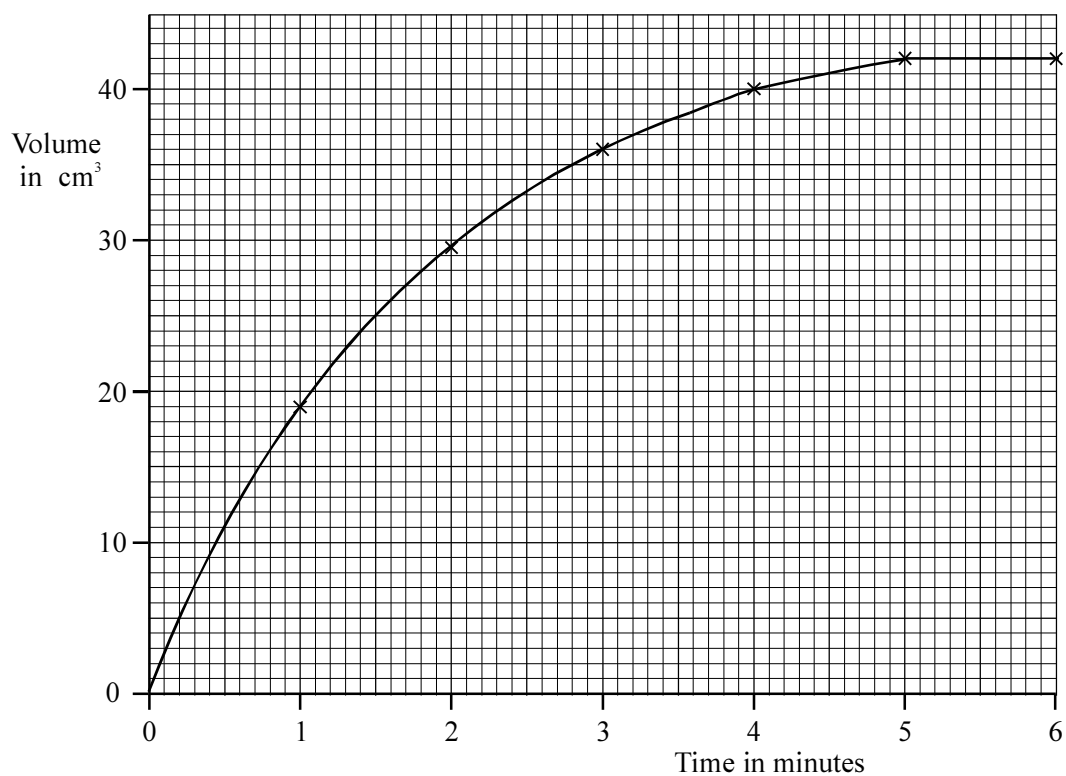
TURN OVER FOR QUESTION 3

3. Magnesium ribbon reacts with hydrochloric acid to produce hydrogen.

A student used an excess of hydrochloric acid in the apparatus below to investigate this reaction.



His results are shown on the graph.



(a) What volume of gas was in the syringe at the end of the reaction?

.....

(1)

- (b) State how the rate of reaction changes during the first **four** minutes and explain the change.

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

(2)

- (c) The experiment was repeated using the same quantities of reagents but with the acid at a higher temperature.

Draw on the graph the line that should be obtained at this temperature.

(2)

- (d) Some power stations burn coal in the production of electricity. The coal is ground to a fine powder before being burned in the furnace.

Use your knowledge of rates of reaction to suggest why the coal is ground to a fine powder rather than used in large lumps.

.....
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.....

(2)

(Total 7 marks)

TURN OVER FOR QUESTION 4

4. (a) Natural gas is used as a fuel for heating and cooking. Natural gas contains the hydrocarbon methane.

Write the balanced equation for the burning of methane in air.

.....

(3)

- (b) In the early 1700's, scientists used the phlogiston theory to explain what happened when a substance burned.

This theory states that every substance is made of ash and phlogiston. When a substance burns, the phlogiston escapes and the ash is left behind.

Lavoisier was a French scientist. He found that some substances became heavier when they burned.

Use your knowledge of burning to explain the results of Lavoisier's experiments and how they showed that the phlogiston theory was wrong.

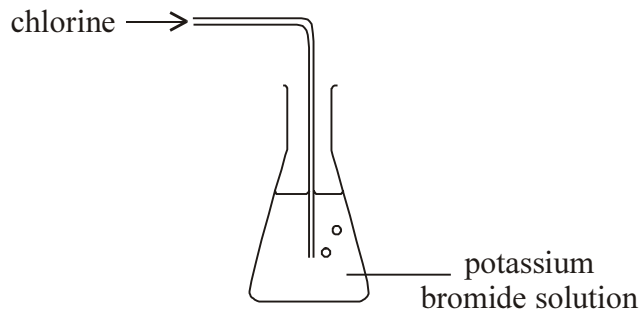


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(5)

(Total 8 marks)

5. (a) When chlorine is bubbled into potassium bromide solution, the solution turns red-brown.



Explain this observation and give the reason why this reaction takes place.



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(4)

- (b) The halogens have similar chemical properties.
Explain this by reference to their electronic structures.

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(2)

- (c) Chlorine reacts with iron.
Write the balanced equation for this reaction.

.....

(3)

(Total 9 marks)

TURN OVER FOR QUESTION 6

6. The table below gives information about the main fractions obtained from crude oil.

Fraction	Boiling range (°C)	Number of carbon atoms in each molecule
gas	-40 to 40	1 to 4
petrol	40 to 100	4 to 8
naphtha	100 to 160	6 to 10
kerosene	160 to 250	10 to 16
diesel oil	250 to 300	16 to 20
fuel oil	300 to 350	20 to 25

(a) State and explain the pattern shown between the boiling range of the fractions and the number of carbon atoms in each molecule.

.....

.....

.....

.....

(2)

(b) Fuel oil is cracked to form more useful products such as petrol and naphtha. Cracking produces a mixture of saturated and unsaturated hydrocarbons.

(i) Describe how cracking is carried out.

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.....

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(2)

(ii) Describe a test for an unsaturated hydrocarbon.

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.....

.....

(2)

(c) Propene (C_3H_6) can be obtained by cracking alkanes.

(i) Draw the structure of a molecule of propene showing **all** the bonds.

(2)

(ii) One molecule of the alkane decane ($C_{10}H_{22}$) was cracked to give two molecules of propene and one molecule of an alkane.

Write the balanced equation for this reaction.

.....

(2)

(d) Propene is used to make poly(propene).

(i) What feature of a propene molecule enables it to form poly(propene)?

.....

(1)

(ii) Draw the structure of the repeating unit in poly(propene).

(2)

(iii) Poly(ethene) is used to make many types of bottle.

Suggest why the more expensive poly(propene) is used to make bottles for fizzy drinks.

.....

.....

(1)

(Total 14 marks)

7. The table below shows some information about the isotopes of chlorine.

(a) Use information from the periodic table to help you complete the table.

Isotope	Mass Number	Abundance	Number of protons in one atom	Number of electrons in one atom	Number of neutrons in one atom
chlorine-35	35	75%	.....	.....	.....
chlorine-37	37	25%	.....	.....	.....

(3)

(b) Draw a dot and cross diagram for a molecule of chlorine, showing outer electrons only.

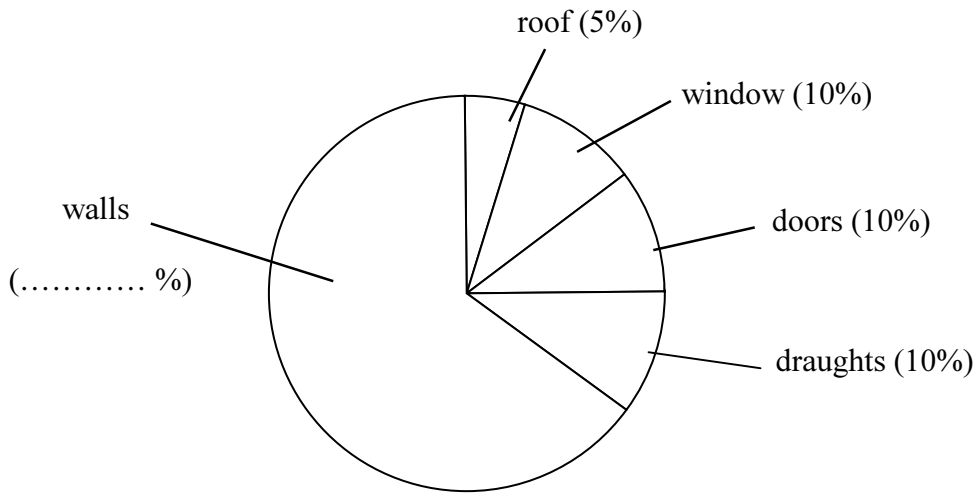
(2)

(Total 5 marks)

TOTAL MARK 60

END

1. (a) The main heat energy losses from a house are shown in the diagram.



(i) Complete the diagram to show the percentage heat energy loss through the walls.

(1)

(ii) Complete the table below to show how the heat energy loss from each part of the house can be reduced. The first one has been done for you.

Part of the house	Method used for reducing heat energy loss
roof	glass-fibre insulation in the loft
walls	..........
floor	..........

(2)

- (b) Double glazing is used to reduce the heat energy loss from houses through the windows. The table compares the heat loss for ordinary windows and for double glazed windows.

Type of window	Heat energy passing through (joules per second)
ordinary window	224
double-glazed window	116

The size of the windows and the temperature inside and outside the house are the same in each case.

- (i) How many joules per second does using double glazing save?

.....
(1)

- (ii) How much energy would pass through an ordinary window in one hour?

.....
.....
.....joules
(3)

- (c) A double glazing salesman claims that by replacing ordinary windows with double glazed windows, the heating bills of a house will be halved.

Use the information given earlier to show whether this claim is true or not.



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(3)

(Total 10 marks)

TURN OVER FOR QUESTION 2

2. Radon is a radioactive gas. It escapes from underground rocks and causes a large part of the natural background radiation in the United Kingdom.

(a) Radon-220 (${}^{220}_{86}\text{Rn}$) is an isotope of radon.

(i) How many protons are there in a nucleus of radon-220?

.....
(1)

(ii) How many neutrons are there in a nucleus of radon-220?

.....
(1)

(iii) Explain what is meant by the statement: "This element has three isotopes".

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

- (b) • Radon-220 has a short half-life and emits α -particles.
- Alpha particles are easily stopped by material and only travel a short distance in air.
- Radon gas is thought to produce harmful effects.

When home owners, in areas where radon gas is produced, were told of the risks, very few took notice.

- (i) Explain why the presence of radon gas in buildings is a health hazard.

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(3)

- (ii) Discuss why, you think, so few people took any action to reduce the risks due to radon gas.



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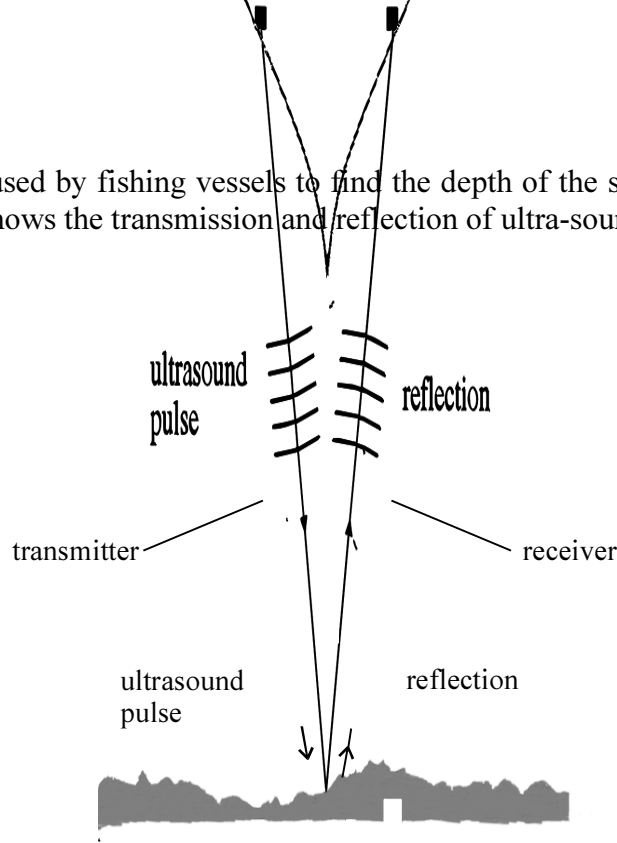
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(4)

(Total 11 marks)

TURN OVER FOR QUESTION 3

3. Ultrasound can be used by fishing vessels to find the depth of the sea or to locate shoals of fish. The diagram shows the transmission and reflection of ultra-sound from a fishing vessel.



- (a) What is ultrasound?

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(2)

- (b) Waves with small wavelengths spread out (diffract) less than those with long wavelengths. Use this information to suggest why ultrasound is much better than ordinary sound for finding the depth of the sea.

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(3)

(Total 5 marks)

4. Optical fibres are used to carry information. The information is carried by the light beam in the form of a digital signal.

(a) (i) Draw a diagram to show what is meant by a digital signal.

(1)

(ii) The signal from a microphone is an analogue signal. How does an analogue signal differ from a digital signal?

.....
.....

(1)

(b) When signals are sent through optical fibres they lose energy.

(i) State what happens to the brightness of the light beam as it loses energy.

.....

(1)

(ii) State **one** disadvantage of losing energy as the light beam travels through the optical fibre.

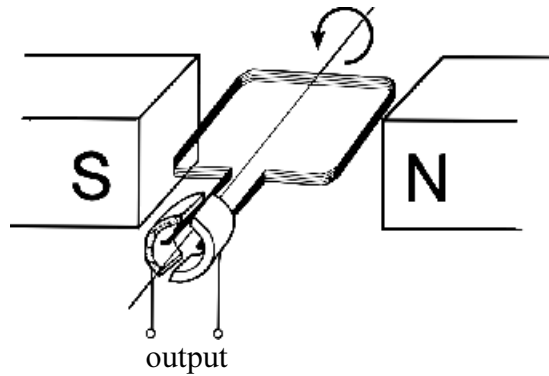
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(1)

(Total 4 marks)

TURN OVER FOR QUESTION 5

5. (a) The diagram shows the construction of a simple electrical generator. When the coil is rotated, an alternating voltage is produced at the output.



- (i) Explain what is meant by an alternating voltage.

.....
.....

(1)

- (ii) State **two** ways in which the voltage output could be increased.

1

2

(2)

(b) The generators at a power plant produce a voltage of 25 000 V. For long distance transmission, on overhead power lines, this is stepped up to 400 000 V. It is later stepped down to 240 V for domestic use.

(i) Why is the voltage stepped up to 400 000 V.

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.....
.....

(2)

(ii) A transformer is used to step up the voltage. Calculate the ratio of primary turns to secondary turns needed for this transformer.

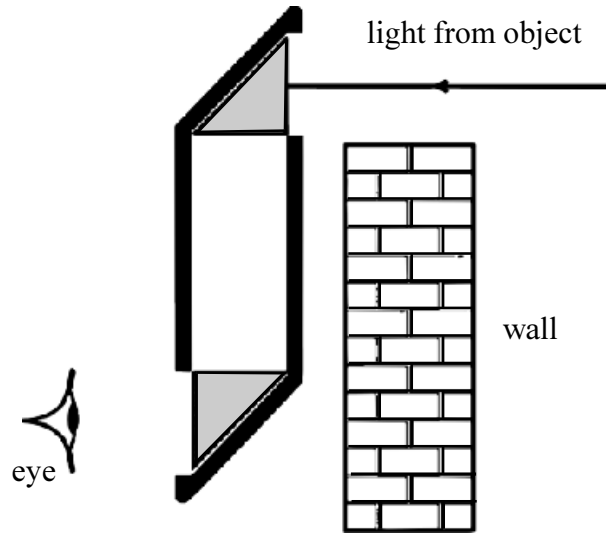
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(3)

(Total 8 marks)

TURN OVER FOR QUESTION 6

6. (a) The diagram shows a simple periscope used to look at objects over the top of a wall.

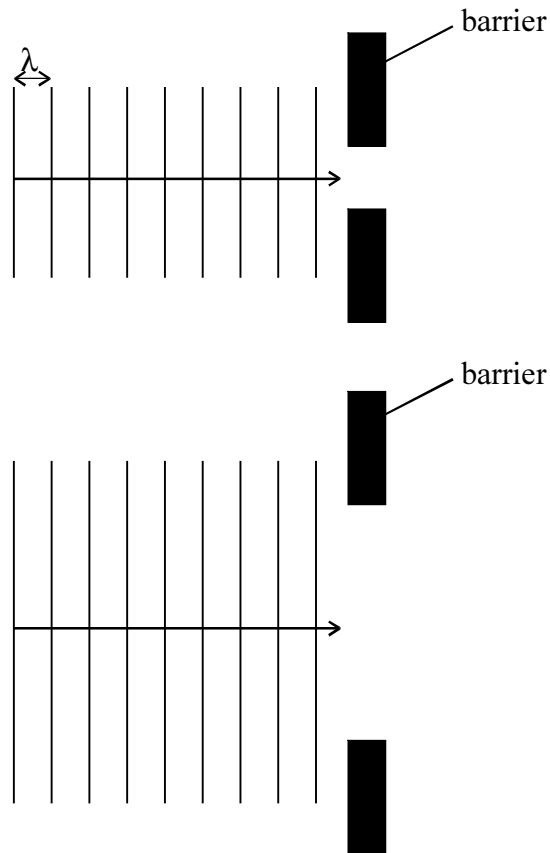


Complete the path of the light entering the top prism to show how it reaches the eye.

(2)

(b) Waves are diffracted when they pass through a gap in a barrier.

(i) Complete the diagrams below to show how the effect of diffraction depends on the size of the gap.



(4)

(ii) What other factor affects the diffraction that occurs when a wave passes through a gap?

.....

(1)

(Total 7 marks)

TURN OVER FOR QUESTION 7

7. (a) The nearest star to the Earth is the Sun. Heat and light from the Sun arrive at the Earth's surface after travelling many millions of kilometres through space.

(i) How does this confirm that heat and light are electromagnetic radiation?

.....
.....

(1)

(ii) Which part of the electromagnetic spectrum is associated with heat radiation?

.....
.....

(1)

(iii) The Sun also emits ultraviolet radiation.

What are the health hazards of this type of radiation?

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.....

(2)

(b) Stars are formed from very large clouds of gases, mainly hydrogen and helium, and some dust. These clouds collapse under the action of gravity.

(i) Describe the energy changes taking place as clouds of gas and dust particles collapse under the action of gravity.

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.....
.....

(2)

(ii) Explain why nuclear reactions take place if a sufficiently large cloud of material collapses under the action of gravity.

.....
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.....

(2)

- (c) The fusion of hydrogen takes place in the core of the Sun to produce helium. This process releases considerable amounts of energy.

Describe the sequence of events which may occur as a star uses up its supply of hydrogen.



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(4)

- (d) One of the theories concerned with the origin of the universe is the ‘Big Bang’ theory. Describe this theory and state what evidence there is to support it.

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.....

.....

(3)

(Total 15 marks)

TOTAL MARK 60

END

Syllabus 1521

Science: Single Award A

Specimen Paper 1F

MARK SCHEME

First Examination Summer 2003

Edexcel
Success through qualifications

USING THE MARK SCHEME

1. This mark scheme gives you;
 - * an idea of the type of response expected
 - * how individual marks are to be awarded
 - * the total mark for each question
 - * examples of responses that should not receive credit.
2. ; separates points for the award of each mark.
3. / means that the responses are **alternatives** and either answer should receive full credit.
4. () means that a phrase/word is not essential for the award of the mark but helps the examiner to get the sense of the expected answer.
5. Phrases/words in **bold** indicate that the meaning of the phrase/word is **essential** to the answer.
6. OWTTE (or words to that effect) and eq (equivalent) indicate that valid alternative answers (which have not been specified) are acceptable.
7. 'Ignore' means that this answer is not worth a mark but does not negate an additional correct response.
8. 'Reject' means that the answer is wrong and negates any additional correct response for that specific mark.
9. ORA (or reverse argument) indicates that the complete reverse is also valid for the award of marks.
10. ecf (error carried forward) means that a wrong answer given in an earlier part of a question is used correctly in answer to a later part of the same question.

MARKING

1. You must give a tick (in red) for every mark awarded. The tick must be placed on the script close to the answer. The mark awarded for part of a question should be written in the margin close to the sub-total.
2. The sub-total marks for a question should be added together and the total mark written and ringed at the end of the question then transferred to the front of the script.
3. Suggestion/explanation questions should be marked correct even when the suggestion is contained within the explanation.
4. **Do not** award marks for repetition of the stem of the question.
5. Make sure that the answer makes sense. Do not give credit for correct words/phrases which are put together in a meaningless manner. Answers must be in the correct scientific context.

AMPLIFICATION

1. In calculations, full credit must be given for a bold, correct answer. If a numerical answer is incorrect, look at the working and award marks according to the mark scheme.
2. Consequential marking should be used in calculations. This is where a candidate's working is correct but is based upon a previous error. When consequential marks have been awarded write "ecf" next to the ticks.
3. If candidates use the mole in calculations they must be awarded full marks for a correct answer even though the term may not be on the syllabus at their level.
4. If candidates use chemical formulae instead of chemical names, credit can only be given if the formulae are correct..

QUALITY OF WRITTEN COMMUNICATION

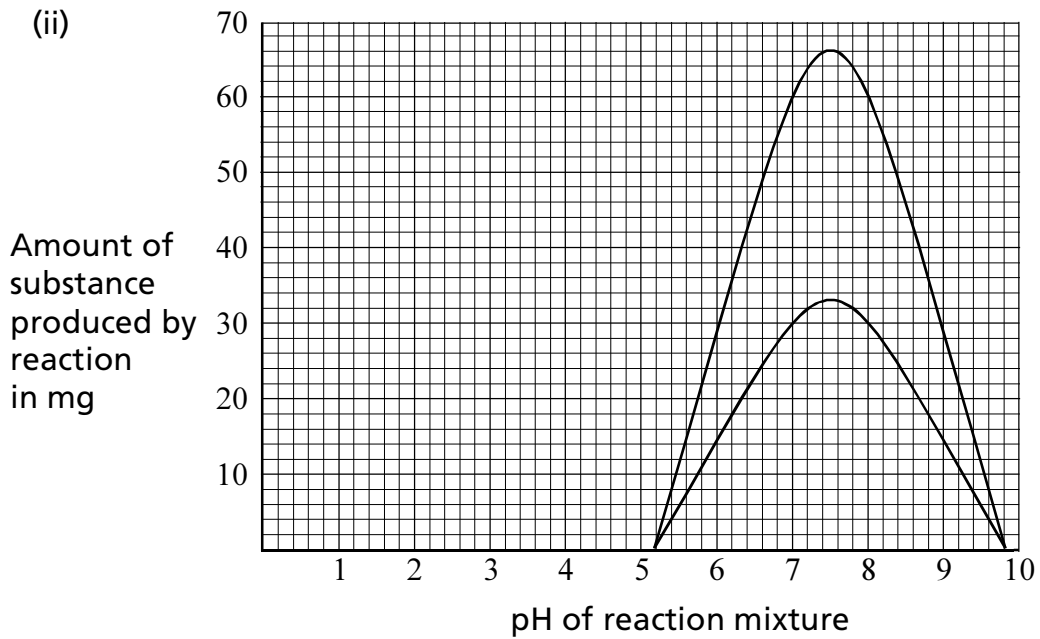


This logo indicates where students will be assessed on their ability to:

- present relevant information in a form that suits its purpose
- ensure that spelling, punctuation and grammar are accurate, so that the meaning is clear
- use a suitable structure and style of writing.

1.	(a)	numbers decrease/eq;	1
	(b)	no food/grass for rabbits/eq; no food/rabbits for foxes;	2
			Total 3 marks
2.		decreases; decreases; increases; stays the same;	4
			Total 4 marks
3.	(a)	keep (sulfur dioxide) gas in/keep water vapour in/eq;	1
	(b)	control/see what effect water had/comparison;	1
	(c)	Any two from: <ul style="list-style-type: none"> • temperature; • dampness of cotton wool/humidity; • size of bag; • transparency/thickness of bag; • number of seeds; 	2
	(d) (i)	75;	1
	(ii)	no germination happened/eq;	1
			Total 6 marks
4.	(a) (i)	37.1;	1
	(ii)	14/15;	1
	(iii)	thermometer;	1
	(b) (i)	oestrogen;	1
	(ii)	(in the) blood;	1
	(iii)	Any two from: <ul style="list-style-type: none"> • enlarged breasts; • body shape eg hips widen; • lack of facial hair; • high voice; 	2
	(iv)	for embryo to implant/placenta to establish/ to allow fetus to develop/obtain enough nutrients;	1
			Total 8 marks

5. (a) 50 (mg); 1
 (b) (i) 2.5; 1



same max and min pH values;
 peak height about half original; 2

- (c) (i) amino acid/polypeptide; 1
 (ii) glucose; 1

Total 6 marks

6. (a) (i) seven; 1
 (ii) 1; 1
 (iii) pupil size decreases;
 as light intensity increases; 2

- (b) retina;
 brain;
 optic;
 muscle;
 iris; 5

Total 9 marks

7. (a) fewer red cells;
 more white cells; 2

- (b) A suggestion to include two from:
 1. red cells;
 2. transport oxygen;
 3. needed for respiration/to release energy; 2

Total 4 marks

8. (a) C/Lucy and Daniel have same coloured eyes; 1
- (b) (i) male;
 blue; 2
- (ii) X from ovum/mother;
 Y from sperm/father; 2
- (c) (i) Lucy; 1
- (ii) Rachel's twin must:
 • be a girl/Lucy or Sarah;
 • have brown eyes/can't have blue eyes; 2

Total 8 marks

9. (a) (i) numbers remain constant/eq;
 over a long period of time; 2
- (ii) A suggestion to include two from:
 • predation;
 • some survive;
 • to continue the species/eq; 2
- (iii) mutation/environmental factor/eq; 1
- (iv) A description to include three from:
 • environmental pressure/eq;
 • competition;
 • individuals with beneficial characteristics;
 • survive;
 • reproduce;
 • pass on characteristic to offspring;
 plus one communication mark for ensuring that
 spelling, punctuation and grammar are accurate, so
 that the meaning is clear; 4
- (b) nature plays an important part in artificial selection; 1
- (c) lecture;
 publish (in journal); 2

Total 12 marks

TOTAL MARK 60

Syllabus 1521

Science: Single Award A

Specimen Paper 2F

MARK SCHEME

First Examination Summer 2003

USING THE MARK SCHEME

1. This mark scheme gives you;
 - * an idea of the type of response expected
 - * how individual marks are to be awarded
 - * the total mark for each question
 - * examples of responses that should not receive credit.
2. ; separates points for the award of each mark.
3. / means that the responses are **alternatives** and either answer should receive full credit.
4. () means that a phrase/word is not essential for the award of the mark but helps the examiner to get the sense of the expected answer.
5. Phrases/words in **bold** indicate that the meaning of the phrase/word is **essential** to the answer.
6. OWTTE (or words to that effect) and eq (equivalent) indicate that valid alternative answers (which have not been specified) are acceptable.
7. 'Ignore' means that this answer is not worth a mark but does not negate an additional correct response.
8. 'Reject' means that the answer is wrong and negates any additional correct response for that specific mark.
9. ORA (or reverse argument) indicates that the complete reverse is also valid for the award of marks.
10. ecf (error carried forward) means that a wrong answer given in an earlier part of a question is used correctly in answer to a later part of the same question.

MARKING

1. You must give a tick (in red) for every mark awarded. The tick must be placed on the script close to the answer. The mark awarded for part of a question should be written in the margin close to the sub-total.
2. The sub-total marks for a question should be added together and the total written and ringed at the end of the question then transferred to the front of the script.
3. Suggestion/explanation questions should be marked correct even when the suggestion is contained within the explanation.
4. **Do not** award marks for repetition of the stem of the question.
5. Make sure that the answer makes sense. Do not give credit for correct words/phrases which are put together in a meaningless manner. Answers must be in the correct scientific context.

AMPLIFICATION

1. In calculations, full credit must be given for a bold, correct answer. If a numerical answer is incorrect, look at the working and award marks according to the mark scheme.
2. Consequential marking should be used in calculations. This is where a candidate's working is correct but is based upon a previous error. When consequential marks have been awarded write "ecf" next to the ticks.
3. If candidates use the mole in calculations they must be awarded full marks for a correct answer even though the term may not be on the syllabus at their level.
4. If candidates use chemical formulae instead of chemical names, credit can only be given if the formulae are correct.

QUALITY OF WRITTEN COMMUNICATION



Students will be assessed on their ability to:

- present relevant information in a form that suits its purpose
- ensure that spelling, punctuation and grammar are accurate, so that the meaning is clear
- use of a suitable structure and style of writing.

- | | | | | |
|----|-----|-------|---|---|
| 1. | (a) | (i) | S; | 1 |
| | | (ii) | lithium/potassium/rubidium/caesium/francium; | 1 |
| | | (iii) | beryllium/magnesium/calcium/strontium/barium/radium; | 1 |
| | | (iv) | oxygen/sulfur/selenium/tellurium/polonium; | 1 |
| | | (v) | 10; | 1 |
| | | (vi) | lithium/beryllium/boron/carbon/nitrogen/oxygen/fluorine/neon; | 1 |
| | (b) | | Any two non-metallic elements;; | 2 |

Total 8 marks

- | | | | |
|----|-----|--|---|
| 2. | (a) | H ₂ O;
N ₂ ;
CH ₄ ;
CO; | 3 |
| | (b) | A description to include: <ul style="list-style-type: none"> • (bubble gas through) limewater; • which turns milky/cloudy; | 2 |
| | (c) | CO ₂ ;
g; | 2 |

Total 8 marks

- | | | | |
|----|-----|--|---|
| 3. | (a) | A description to include three from: <ul style="list-style-type: none"> • fizzes/bubbles; • moves about; • floats on water; • white smoke; • burns with yellow flame; • dissolves/gets smaller; plus 1 communication mark for presenting relevant information in a form that suits its purpose; | 4 |
| | (b) | hydrogen; | 1 |
| | (c) | alkaline; | 1 |

Total 6 marks

4. (a) (i) hydrogen; 1
(ii) ethane; 1
(iii) hexane; 1
(iv) propane; 1
- (b) (i) points plotted correctly;;
smooth curve; 3
(ii) value in range 32 to 38 °C; 1
- (c) (i) fractional;
distillation; 2
(ii) Any two from:
• petrol;
• naphtha;
• kerosine;
• diesel (oil);
• fuel oil; 2
- (d) oxygen;
water/steam/hydrogen oxide; 2

Total 14 marks

5. (a) (i) Particle A - electron;
Particle B - neutron;
Particle C - proton; 3
(ii) 7; 1
(iii) one electron in outer shell; 1
- (b) $2\text{Na} + \text{Cl}_2 \longrightarrow 2\text{NaCl}$
formulae correct;
balanced; 2

Total 7 marks

6. (a) atom: 2:8:7/equivalent diagram;;
 ion: 2:8:8/equivalent diagram;;
 in each case allow 1 mark for correct outer shell; 4
- (b) An explanation to include:
 • shared pair;
 • of electrons; 2
- (c) (i) dissolved;
 in water; 2
- (ii) sodium hydroxide/sodium oxide/sodium carbonate;
 (+ hydrochloric acid)
 → (sodium chloride +)
 water/water (+ carbon dioxide); 2

Total 10 marks

7. (a) 42 (cm³); 1
- (b) rate of reaction decreases;
 as acid concentration falls/reactants or acid used up/
 fewer collisions; 2
- (c) line steeper than original;
 but reaching same maximum volume; 2
- (d) A suggestion to include:
 • powder burns faster than lumps;
 • because of greater surface area; 2

Total 7 marks

TOTAL MARK 60

Syllabus 1521

Science: Single Award A

Specimen Paper 3F

MARK SCHEME

First Examination Summer 2003

USING THE MARK SCHEME

1. This mark scheme gives you;
 - * an idea of the type of response expected
 - * how individual marks are to be awarded
 - * the total mark for each question
 - * examples of responses that should not receive credit.
2. ; separates points for the award of each mark.
3. / means that the responses are **alternatives** and either answer should receive full credit.
4. () means that a phrase/word is not essential for the award of the mark but helps the examiner to get the sense of the expected answer.
5. Phrases/words in **bold** indicate that the meaning of the phrase/word is **essential** to the answer.
6. OWTTE (or words to that effect) and eq (equivalent) indicate that valid alternative answers (which have not been specified) are acceptable.
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8. 'Reject' means that the answer is wrong and negates any additional correct response for that specific mark.
9. ORA (or reverse argument) indicates that the complete reverse is also valid for the award of marks.
10. ecf (error carried forward) means that a wrong answer given in an earlier part of a question is used correctly in answer to a later part of the same question.

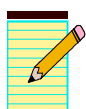
MARKING

1. You must give a tick (in red) for every mark awarded. The tick must be placed on the script close to the answer. The mark awarded for part of a question should be written in the margin close to the sub-total.
2. The sub-total marks for a question should be added together and the total mark written and ringed at the end of the question then transferred to the front of the script.
3. Suggestion/explanation questions should be marked correct even when the suggestion is contained within the explanation.
4. **Do not** award marks for repetition of the stem of the question.
5. Make sure that the answer makes sense. Do not give credit for correct words/phrases which are put together in a meaningless manner. Answers must be in the correct scientific context.

AMPLIFICATION

1. In calculations, full credit must be given for a bold, correct answer. If a numerical answer is incorrect, look at the working and award marks according to the mark scheme.
2. Consequential marking should be used in calculations. This is where a candidate's working is correct but is based upon a previous error. When consequential marks have been awarded write "ecf" next to the ticks.
3. If candidates use the mole in calculations they must be awarded full marks for a correct answer even though the term may not be on the syllabus at their level.
4. If candidates use chemical formulae instead of chemical names, credit can only be given if the formulae are correct.

QUALITY OF WRITTEN COMMUNICATION



This logo indicates where students will be assessed on their ability to:

- present relevant information in a form that suits its purpose
- ensure that spelling, punctuation and grammar are accurate, so that the meaning is clear
- use a suitable structure and style of writing.

1. (a) Pluto; 1
- (b) Pluto;
heat;
increases; 3
- (c) low density; 1
- (d) (i) largest value of surface gravity; 1
- (ii) Pluto; 1

Total 7 marks

2. (a) wavelength increases;
frequency decreases; 2
- (b) Any two from:
• gamma ray;
• X-ray;
• ultraviolet;
• microwaves; 2
- (c) correct use for named wave;
one mark each correct detail;;
eg microwaves - used to cook food;
- reference to absorption of microwaves;
- causing heating; 3

Total 7 marks

3. (a) (i) cooker;
highest power/most current; 2
- (ii) biggest current for same voltage/needs high current/
high power; 2
largest current with lowest resistance;
- (iii) thick cables have a lower resistance;
thick cables produce less heat; 2
- (b) each lamp has its own circuit/
each lamp can be switched separately;
each lamp has the same voltage/
each can operate at own power; 2

Total 8 marks

4. (a) (i) points plotted correctly;;
smooth curve drawn; 3
- (ii) about 3 km/h; 1
- (iii) 1160 watts; 1
- (iv) not always windy/variable output/too much land needed; 1
- (b) kinetic/movement;
electrical; 2

Total 8 marks

5. (a) (i) 65%; 1
- (ii) walls - draught excluder/curtains/cavity wall insulation;
floor - carpets/wooden floors; 2
[Accept damp proofing for 1 mark]
- (b) (i) 108 W; 1
- (ii) 224×3600 ;;
 8.06×10^5 (J); 3
[Allow 2 marks where 3600 sec has been missed/ 224×60]
- (c) An explanation to include two of:
 - approx 50% of heat lost through window saved;
 - windows only account of 10% of energy lost;
 - only approx 5% saving on heating bills;
 - makes connection between energy and cost;
 plus 1 communication mark for presenting relevant information in a form that suits its purpose; 3

Total 10 marks

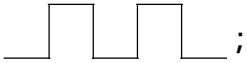
6. (a) (i) 86; 1
- (ii) 134; 1
- (iii) An explanation to include particles with:
 - same number of protons;
 - different numbers of neutrons; 2
- (b) (i) An explanation to include:
 - gas breathed in;
 - α - particles cannot pass through living tissue;
 - named health risk; 3

- (ii) A discussion to include three of:
- lack of understanding of dangers;
 - evidence;
 - cost;
 - information not widely known;
 - complacency;
 - information did not spell out dangers clearly;
 - regional variation;
- plus 1 communication mark for ensuring that spelling, punctuation and grammar are accurate, so that the meaning is clear; 4

Total 11 marks

7. (a) (very) high frequency sound;
beyond human hearing/humans cannot hear this frequency; 2
- (b) A suggestion to include:
- ordinary sound spreads more;
 - concentration less/less intense/
amplitude decreases rapidly;
 - range limited/cannot travel far;
- 3

Total 5 marks

8. (a) (i)  ; 1
- (sharp on/off pulses)
- (ii) continuously variable (or diag)/voltage changing all the time/
can have any value (allow mark if shown on diagram); 1
- (b) (i) decreases/dims/less intense; 1
- (ii) limits range/travels less/ cannot go as far/amplitude less; 1

Total 4 marks

TOTAL MARKS 60

Syllabus 1521

Science: Single Award A

Specimen Paper 4H

MARK SCHEME

First Examination Summer 2003

USING THE MARK SCHEME

1. This mark scheme gives you;
 - * an idea of the type of response expected
 - * how individual marks are to be awarded
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5. Phrases/words in **bold** indicate that the meaning of the phrase/word is **essential** to the answer.
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7. 'Ignore' means that this answer is not worth a mark but does not negate an additional correct response.
8. 'Reject' means that the answer is wrong and negates any additional correct response for that specific mark.
9. ORA (or reverse argument) indicates that the complete reverse is also valid for the award of marks.
10. ecf (error carried forward) means that a wrong answer given in an earlier part of a question is used correctly in answer to a later part of the same question.

MARKING

1. You must give a tick (in red) for every mark awarded. The tick must be placed on the script close to the answer. The mark awarded for part of a question should be written in the margin close to the sub-total.
2. The sub-total marks for a question should be added together and the total mark written and ringed at the end of the question then transferred to the front of the script.
3. Suggestion/explanation questions should be marked correct even when the suggestion is contained within the explanation.
4. **Do not** award marks for repetition of the stem of the question.
5. Make sure that the answer makes sense. Do not give credit for correct words/phrases which are put together in a meaningless manner. Answers must be in the correct scientific context.

AMPLIFICATION

1. In calculations, full credit must be given for a bold, correct answer. If a numerical answer is incorrect, look at the working and award marks according to the mark scheme.
2. Consequential marking should be used in calculations. This is where a candidate's working is correct but is based upon a previous error. When consequential marks have been awarded write "ecf" next to the ticks.
3. If candidates use the mole in calculations they must be awarded full marks for a correct answer even though the term may not be on the syllabus at their level.
4. If candidates use chemical formulae instead of chemical names, credit can only be given if the formulae are correct..

QUALITY OF WRITTEN COMMUNICATION



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- present relevant information in a form that suits its purpose
- ensure that spelling, punctuation and grammar are accurate, so that the meaning is clear
- use a suitable structure and style of writing.

- | | | | |
|----|-----|--|---|
| 1. | (a) | C/Lucy and Daniel have same coloured eyes; | 1 |
| | (b) | (i) male;
blue; | 2 |
| | | (ii) X from ovum/mother;
Y from sperm/father; | 2 |
| | (c) | bb; | 1 |
| | (d) | (i) Lucy; | 1 |
| | | (ii) Rachel's twin must: <ul style="list-style-type: none"> • be a girl/Lucy or Sarah; • have brown eyes/can't have blue eyes; | 2 |

Total 9 marks

- | | | | |
|----|-----|---|---|
| 2. | (a) | fewer red cells;
more white cells; | 2 |
| | (b) | A suggestion to include two from: <ol style="list-style-type: none"> 1. red cells; 2. transport oxygen; 3. needed for respiration/to release energy; | 2 |

Total 4 marks

- | | | | |
|----|-----|--|---|
| 3. | (a) | (i) numbers remain constant/eq;
over a long period of time; | 2 |
| | | (ii) A suggestion to include two from: <ul style="list-style-type: none"> • predation; • some survive; • to continue the species/eq; | 2 |
| | | (iii) mutation/environmental factor/eq; | 1 |
| | | (iv) A description to include three from: <ul style="list-style-type: none"> • environmental pressure/eq; • competition; • individuals with beneficial characteristics; • survive; • reproduce; • pass on characteristic to offspring; plus one communication mark for ensuring that spelling, punctuation and grammar are accurate, so that the meaning is clear; | 4 |

- (b) nature plays an important part in artificial section; 1
- (c) lecture;
publish (in journal); 2

Total 12 marks

4. (a) A - Bowman's/(renal) capsule/eq; 2
B - collecting duct;
- (b) **X** on or near Bowman's capsule/eq; 1

(c)

Substance	Found in			urine
	blood	filtrate in first convoluted tubule	filtrate in second convoluted tubule	
protein	✓			
water	✓	✓	✓	✓
urea	✓	✓	✓	✓
glucose	✓	✓		

Total 7 marks

5. (a) An explanation to include two from:
 - dancing generates heat;
 - heat transferred out of body/cooling essential/eq;
 - prevent enzyme denaturation/death;
 2
- (b) (i) brain; 1
 (ii) kidney; 1
 (iii) in the blood/plasma/bloodstream; 1

Total 5 marks

6. (a) Nn; 2
 NN;
- (b) two; 1
- (c) zero/eq; 1
- (d) half/eq; 1

Total 5 marks

7. (a) (i) relay/intermediate; 1
- (ii) A description to include two from:
 1. synapse;
 2. neurotransmitter;
 3. diffusion; 2
- (b) receptor → neurones → effector → response 3
- All correct - 3 marks
 3 correct - 2 marks
 2 correct - 1 mark
 1 correct - 0 marks

Total 6 marks

8. (a) B
 A
 F
 E 3
- All correct - 3 marks
 3 correct - 2 marks
 2 correct - 1 mark
 1 correct - 0 marks
- (b) 6; 1
- (c) Two from:
 • reduces/halves chromosome number/
 produces haploid cells/eq;
 • produces gametes/sex cells/sperms and eggs;
 • results in cells which are genetically different;
 • occurs in gonads/testes/ovary only;
 • produces 4 cells; 2

Total 6 marks

9.

An explanation to include five from:

- sulphur dioxide/carbon dioxide/nitrogen oxide;
- from factories/car exhaust/burning fossil fuel;
- acid rain;
- kills plants/deforestation;
- kills fish;
- carbon monoxide;
- less oxygen in blood;
- can kill;
- greenhouse effect/global warming;
- eg carbon dioxide/water vapour;
- flooding;
- loss of habitats;
- species extinction;
- disruption of food chains/webs;
- depletion of ozone layer;
- CFCs;
- danger from ultraviolet/UV radiation;

plus one communication mark for using a suitable structure and style of writing;

6

Total 6 marks

TOTAL MARK 60

Syllabus 1521

Science: Single Award A

Specimen Paper 5H

MARK SCHEME

First Examination Summer 2003

Edexcel
Success through qualifications

USING THE MARK SCHEME

1. This mark scheme gives you;
 - * an idea of the type of response expected
 - * how individual marks are to be awarded
 - * the total mark for each question
 - * examples of responses that should not receive credit.
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8. 'Reject' means that the answer is wrong and negates any additional correct response for that specific mark.
9. ORA (or reverse argument) indicates that the complete reverse is also valid for the award of marks.
10. ecf (error carried forward) means that a wrong answer given in an earlier part of a question is used correctly in answer to a later part of the same question.

MARKING

1. You must give a tick (in red) for every mark awarded. The tick must be placed on the script close to the answer. The mark awarded for part of a question should be written in the margin close to the sub-total.
2. The sub-total marks for a question should be added together and the total mark written and ringed at the end of the question then transferred to the front of the script.
3. Suggestion/explanation questions should be marked correct even when the suggestion is contained within the explanation.
4. **Do not** award marks for repetition of the stem of the question.
5. Make sure that the answer makes sense. Do not give credit for correct words/phrases which are put together in a meaningless manner. Answers must be in the correct scientific context.

AMPLIFICATION

1. In calculations, full credit must be given for a bold, correct answer. If a numerical answer is incorrect, look at the working and award marks according to the mark scheme.
2. Consequential marking should be used in calculations. This is where a candidate's working is correct but is based upon a previous error. When consequential marks have been awarded write "ecf" next to the ticks.
3. If candidates use the mole in calculations they must be awarded full marks for a correct answer even though the term may not be on the syllabus at their level.
4. If candidates use chemical formulae instead of chemical names, credit can only be given if the formulae are correct.

QUALITY OF WRITTEN COMMUNICATION



This logo indicates where students will be assessed on their ability to:

- present relevant information in a form that suits its purpose
- ensure that spelling, punctuation and grammar are accurate, so that the meaning is clear
- use a suitable structure and style of writing.

1. (a) (i) Particle A - electron;
Particle B - neutron;
Particle C - proton; 3
- (ii) 7; 1
- (iii) one electron in outer shell; 1
- (b) $2\text{Na} + \text{Cl}_2 \longrightarrow 2\text{NaCl}$
formulae correct;
balanced; 2

Total 7 marks

2. (a) atom: 2:8:7/equivalent diagram;;
ion: 2:8:8/equivalent diagram;;
in each case allow 1 mark for correct outer shell; 4
- (b) An explanation to include:
• shared pair;
• of electrons; 2
- (c) (i) dissolved;
in water; 2
- (ii) sodium hydroxide/sodium oxide/sodium carbonate;
(+ hydrochloric acid);
→ (sodium chloride +) water/water (+ carbon dioxide); 2

Total 10 marks

3. (a) 42 cm^3 ; 1
- (b) rate of reaction decreases;
as acid concentration falls/reactants or acid used up;
fewer collisions; 2
- (c) line steeper than original;
but reaching same maximum volume; 2
- (d) A suggestion to include:
• powder burns faster than lumps;
• because of greater surface area; 2

Total 7 marks

4. (a) $\text{CH}_4 + 2\text{O}_2 \longrightarrow \text{CO}_2 + 2\text{H}_2\text{O}$
LHS formulae;
RHS formulae;
balanced; 3

(b) An explanation to include:
• actually got an increase in weight;
• had combined with something in the air;
• if phlogiston lost, would weigh less;
• oxygen;
plus one communication mark for ensuring text is legible
and that spelling, punctuation and grammar are accurate,
so that the meaning is clear; 5

Total 8 marks

5. (a) An explanation to include:
• bromine replaced;
• by chlorine;
• chlorine more reactive;
plus 1 communication mark for presenting relevant
information in a form that suits its purpose; 4

(b) An explanation to include:
• same number of outer electrons;
• 7 outer electrons/
1 short of noble gas configuration; 2

(c) $2\text{Fe} + 3\text{Cl}_2 \longrightarrow 2\text{FeCl}_3$
LHS formulae;
RHS formulae;
balanced; 3

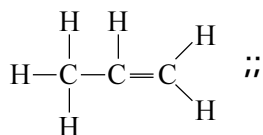
Total 9 marks

7. (a) An explanation to include:
• the more carbon atoms, the higher the boiling point;
• more energy needed to separate larger molecules; 2

(b) (i) A description to include two from:
• high temperature;
• catalyst;
• absence of air; 2

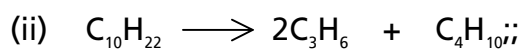
(ii) A description to include:
• bromine (water);
• is decolourised; 2

(c) (i)

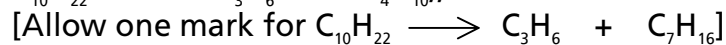


[Allow one mark for C=C]

2



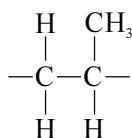
2



(d) (i) double bond;

1

(ii)



2

(iii) poly(propene) stronger;

1

Total 14 marks

9. (a)

17	17	18
17	17	20

each vertical pair;

3

(b) correct diagram;;

2

[Allow one mark for one shared pair of electrons]

Total 5 marks

TOTAL MARK 60

Syllabus 1521

Science: Single Award A

Specimen Paper 6H

MARK SCHEME

First Examination Summer 2003

USING THE MARK SCHEME

1. This mark scheme gives you;
 - * an idea of the type of response expected
 - * how individual marks are to be awarded
 - * the total mark for each question
 - * examples of responses that should not receive credit.
2. ; separates points for the award of each mark.
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8. 'Reject' means that the answer is wrong and negates any additional correct response for that specific mark.
9. ORA (or reverse argument) indicates that the complete reverse is also valid for the award of marks.
10. ecf (error carried forward) means that a wrong answer given in an earlier part of a question is used correctly in answer to a later part of the same question.

MARKING

1. You must give a tick (in red) for every mark awarded. The tick must be placed on the script close to the answer. The mark awarded for part of a question should be written in the margin close to the sub-total.
2. The sub-total marks for a question should be added together and the total mark written and ringed at the end of the question then transferred to the front of the script.
3. Suggestion/explanation questions should be marked correct even when the suggestion is contained within the explanation.
4. **Do not** award marks for repetition of the stem of the question.
5. Make sure that the answer makes sense. Do not give credit for correct words/phrases which are put together in a meaningless manner. Answers must be in the correct scientific context.

AMPLIFICATION

1. In calculations, full credit must be given for a bold, correct answer. If a numerical answer is incorrect, look at the working and award marks according to the mark scheme.
2. Consequential marking should be used in calculations. This is where a candidate's working is correct but is based upon a previous error. When consequential marks have been awarded write "ecf" next to the ticks.
3. If candidates use the mole in calculations they must be awarded full marks for a correct answer even though the term may not be on the syllabus at their level.
4. If candidates use chemical formulae instead of chemical names, credit can only be given if the formulae are correct.

QUALITY OF WRITTEN COMMUNICATION



This logo indicates where students will be assessed on their ability to:

- present relevant information in a form that suits its purpose
- ensure that spelling, punctuation and grammar are accurate, so that the meaning is clear
- use a suitable structure and style of writing.

1. (a) (i) 65%; 1
- (ii) walls - draught excluder/curtains/cavity wall insulation;
floor - carpets/wooden floors;
[Accept damp proofing for 1 mark] 2
- (b) (i) 108 W; 1
- (ii) 224×3600 ;;
 8.06×10^5 (J); 3
[Allow 2 marks where 3600 sec has been missed/ 224×60]
- (c) An explanation to include two of:
 - approx 50% of heat lost through window saved;
 - windows only account of 10% of energy lost;
 - only approx 5% saving on heating bills;
 - makes connection between energy and cost;
 plus 1 communication mark for presenting relevant information in a form that suits its purpose; 3

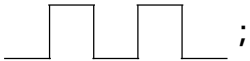
Total 10 marks

2. (a) (i) 86; 1
- (ii) 134; 1
- (iii) An explanation to include particles with:
 - same number of protons;
 - different numbers of neutrons; 2
- (b) (i) An explanation to include:
 - gas breathed in;
 - α - particles cannot pass through living tissue;
 - named health risk; 3
- (ii) A discussion to include three of:
 - lack of understanding of dangers;
 - evidence;
 - cost;
 - information not widely known;
 - complacency;
 - information did not spell out dangers clearly;
 - regional variation;
 plus 1 communication mark for ensuring that spelling, punctuation and grammar are accurate, so that the meaning is clear; 4

Total 11 marks

3. (a) (very) high frequency sound;
beyond human hearing/humans cannot hear this frequency; 2
- (b) A suggestion to include:
 - ordinary sound spreads more;
 - concentration less/less intense/amplitude decreases rapidly;
 - range limited/cannot travel far; 3

Total 5 marks

4. (a) (i)  ; 1
(sharp on/off pulses)
- (ii) continuously variable (or diag)/voltage changing all the time/
can have any value (allow mark if shown on diagram); 1
- (b) (i) decreases/dims/less intense; 1
- (ii) limits range/travels less/ cannot go as far/amplitude less; 1

Total 4 marks

5. (a) (i) changing polarity, 1
- (ii) Any two from:
 - stronger magnet;
 - more turns;
 - increase speed rotation;
 - placing coil on soft iron core; 2
- (b) (i) An explanation to include:
 - higher V, less I;
 - less I, lower heating effect; 2
- (ii) $\frac{N_p}{N_s} = \frac{V_p}{V_s}; = \frac{25000}{400\,000} = \frac{1}{16}$ (or $\frac{16}{1}$ if secondary to primary);; 3

Total 8 marks

6. (a) total internal reflection shown at both surfaces;
quality of diagram; 2
- (b) (i) top diagram shows circular waves;
lower diagram shows less diffraction than top diagram;
either diagram shows at least three waves drawn;
either diagram shows no change in wavelength of
diffracted waves; 4
- (ii) wavelength; 1

Total 7 marks

7. (a) (i) only electromagnetic waves can travel through space/vacuum; 1
- (ii) infra-red; 1
- (iii) cancer (skin); 2
one other identified danger eg damage to eyes;
- (b) (i) A description to include:
• potential energy at distance/
KE increases as particles move in;
• heat energy increases; 2
- (ii) An explanation to include:
• KE increasing therefore temperature increasing/
total energy more;
• at high temperature nuclei can undergo fusion; 2
- (c) A description of events to include three from:
• hydrogen gone → centre cools;
• star pulled in, collapses;
• KE increased again, temp rises;
• fusion of heavier elements;
• Red giant;
• explosion;
plus 1 communication mark for presenting relevant
information in a form that suits its purpose 4
- (d) A description to include three from:
• hot "super atom" erupted in a burst of energy;
• Universe is expanding/
galaxies appear to be moving apart;
• background microwave radiation from every direction
in space;
• red shift of emission spectrum;
• started with explosion; 3

Total 15 marks

TOTAL MARK 60

SPECIFICATION GRID Specimen Paper

GCSE SCIENCE: SINGLE AWARD A

Syll. No. 1521 Paper No. 1F Foundation Tier

Maximum mark for Paper 60 Page 1 of 1

Date 7 November 2000

YEAR of EXAM

2003

Q	Spec.Ref.	Assessment Objective				Total Mark	Level of Demand		SocEET aspects	Short ans./ Object.	Equ ⁿ & Calc ⁿ .	Extended Prose		
		A01		A02	A03		Low	Stand.				= 2	> 2	Comm.
		K & U												
		51 – 62												
		Recall	Other	Applic ⁿ	Inv.Sc.		G-E	D-C						
		11-14	22-27	19-26	0-3	60	30-36	24-30	✓	≤40	seeCQC	~12	~3	~2
1	4.03		3			3	3		✓	1		2		
2	1.11/40/41	2	2			4	4		✓	4				
3	4.02			4	2	6	6		✓	5	1			
4	1.25/27/28	4	2	2		8	8		✓	8				
5	1.08/09	2		4		6	6		✓	6				
6	1.20/21/23	2	3	4		9	9			7		2		
7	1.10/11		2	2		4		4				4		
8	3.14	2	2	4		8		8		4		4		
9	3.04/12	3	7	2		12		12	✓	4		4	3	1
	Total	15	21	22	2	60	36	24		39	1	16	3	1

SPECIFICATION GRID Specimen Paper

GCSE SCIENCE: SINGLE AWARD A

Syll. No. 1521 Paper No. 2F Foundation Tier

Maximum mark for Paper 60 Page 1 of 1

YEAR of EXAM

2003

Date 7 November 2000

Q	Spec.Ref.	Assessment Objective				Total Mark	Level of demand		SocEET aspects	Short ans./ Object.	Equ ⁿ & Calc ⁿ .	Extended Prose		
		A01		A02	A03		Low	Stand.				= 2	> 2	Comm.
		K & U												
		51 – 62												
		Recall	Other	Applic ⁿ	Inv.Sc.		G-E	D-C						
11-14	22-27	19-26	0-3	60	30-36	24-30	✓	≤40	seeCQC	~12	~3	~2		
1(a)	1.03/2.02/3.02		6			6			6					
(b)	3.01			2	8	2			2					
2(a)	2.02	2	2			4			4					
(b)	4.16	2				2					2			
(c)			2		8	2			2					
3(a)	3.11	1	2	1		4						3	1	
(b)	3.11	1				1			1					
(c)	3.12			1	6	1			1					
4(a)	4.11/13/22		2	2		4			4					
(b)	4.13		3	1		3	1			4				
(c)	4.12/14	4				4		✓	4					
(d)	4.15		2		14	2			2					
5(a)	1.01/03/3.05		1	4			5		5					
(b)	2.04			2	7		2			2				
6(a)	1.04/08		4				4		4					
(b)	1.09	1	1				2				2			
(c)	3.12/15	1	1	2	10		4		2		2			
7(a)	5.03			1			1		1					
(b)	5.03/04		2				2				2			
(c)	5.04			2			2		2					
(d)	5.04/05			2	7		2	✓			2			
	Total	12	28	20	60	35	25		40	6	10	3	1	

SPECIFICATION GRID Specimen Paper

GCSE SCIENCE: SINGLE AWARD A

Syll. No. 1521 Paper No. 3F Foundation Tier

Maximum mark for Paper 60 Page 1 of 1

Date 7 November 2000

YEAR of EXAM 2003

Q	Spec.Ref.	Assessment Objective				Total Mark	Level of demand		SocEET aspects	Short ans./ Object.	Equ ⁿ & Calc ⁿ .	Extended Prose		
		A01	A02	A03	Low		Stand.	= 2				> 2	Comm.	
		K & U		Applic ⁿ										Inv.Sc.
		51 – 62					G-E	D-C						
		Recall	Other											
11-14	22-27	19-26	0-3	60	30-36	24-30	✓	≤40	seeCQC	~12	~3	~2		
1(a)	P4.01			1		1			1					
(b)	P4.01		3			3			3					
(c)	P4.01		1			1			1					
(d)	P4.01		1	1		7			2					
2(a)	P3.13			2		2			2					
(b)	P3.15	2				2			2					
(c)	P3.14	1	2			7			1		2			
3(a)	P1.08/1.14	2	2	2		6			4		2			
(b)	P1.11	1	1			8			2					
4(a)	P5.14		4	2		6			3	3				
(b)	P5.02		1	1		8					2			
5(a)	P5.06	2	1						2	1				
(b)	P5.06			4						4				
(c)	P5.06		2	1		10					2		1	
6(a)	P6.02/03		2	2					2		2			
(b)	P6.05/13	1	4	2		11						6	1	
7(a)	P3.22	2									2			
(b)	P3.08/20/22		3			5						3		
8(a)	P3.18		1	1					2					
(b)	P5.02	2				4			2					
	Total	13	28	19		60	30	30		29	8	12	9	2

SPECIFICATION GRID Specimen Paper

GCSE SCIENCE: SINGLE AWARD A

Syll. No. 1521 Paper No. 4H Higher Tier

Maximum mark for Paper 60 Page 1 of 1

Date 7 November 2000

YEAR of EXAM 2003

Q	Spec.Ref.	Assessment Objective				Total Mark	Level of demand		SocEET aspects	Short ans./ Object.	Equ ⁿ & Calc ⁿ .	Extended Prose		
		A01		A02	A03		Stand.	High				= 2	> 2	Comm.
		K & U												
		51 – 62					D-C	B-A*						
		Recall	Other	Applic ⁿ	Inv.Sc.									
11-14	22-27	19-26	0-3	60	30-36	24-30	✓	≤40	seeCQC	~12	~3	~2		
1	3.14	2	3	4		9	9		5		4			
2	1.10/11		2	2		4	4				4			
3	3.04/12	3	7	2		12	12	✓	4		4	3	1	
4	1.35/36	3	4			7	7		7					
5	1.31/37	2	3			5	5	✓	3		2			
6	3.16/17			5		5	5		5					
7	1.22	1	2	3		6	6		4		2			
8	3.07/08	2		4		6	6		6					
9	4.02	3	3			6	6					5	1	
	Total	16	24	20	2	60	25	35	34		16	8	2	

SPECIFICATION GRID Specimen Paper

GCSE SCIENCE: SINGLE AWARD A

Syll. No. 1521 Paper No. 5H Higher Tier

Maximum mark for Paper 60 Page 1 of 1

Date 7 November 2000

YEAR of EXAM 2003

Q	Spec.Ref.	Assessment Objective				Total Mark	Level of demand		SocEET aspects	Short ans./ Object.	Equ ⁿ & Calc ⁿ .	Extended Prose		
		A01		A02	A03		Stand.	High				= 2	> 2	Comm.
		K & U												
		51 – 62												
		Recall	Other	Applic ⁿ	Inv.Sc.		D-C	B-A*						
		11-14	22-27	19-26	0-3	60	30-36	24-30	✓	≤40	seeCQC	~12	~3	~2
1(a)	1.01/03/3.05		1	4			5			5				
(b)	2.04			2		7	2				2			
2(a)	1.04/08		4				4			4				
(b)	1.09	1	1				2					2		
(c)		1	1	2		10	4			2		2		
3(a)	5.03			1			1			1				
(b)	5.03/04		2				2					2		
(c)	5.04			2			2			2				
(d)	5.04/05			2		7	2		✓			2		
4(a)	2.04/4.11	2	1				3				3			
(b)	4.15/4.16		3	2		8	2	3					4	1
5(a)	3.16		3	1			1	3					3	1
(b)	3.03		2					2				2		
(c)	3.14		1	2		8		3			3			
6(a)	4.13		1	1				2				2		
(b)	4.17/24	4						4	✓			4		
(c)	4.17/23	1	3					4		2	2			
(d)	4.26/27		3	1		14		4		4				
7(a)	1.01/03		2	1				3			3			
(b)	1.12	2				5		2		2				
	Total	11	28	21		60	30	30		22	17	16	7	2

SPECIFICATION GRID Specimen Paper

GCSE SCIENCE: SINGLE AWARD A

Syll. No. 1521 Paper No. 6H Higher Tier

Maximum mark for Paper 60 Page 1 of 1

Date 7 November 2000

YEAR of EXAM 2003

Q	Spec.Ref.	Assessment Objective				Total Mark	Level of demand		SocEET aspects	Short ans./ Object.	Equ ⁿ & Calc ⁿ .	Extended Prose		
		A01		A02	A03		Stand.	High				= 2	> 2	Comm.
		K & U												
		51 – 62												
		Recall	Other	Applic ⁿ	Inv.Sc.		D-C	B-A*						
11-14	22-27	19-26	0-3	60	30-36	24-30	✓	≤40	seeCQC	~12	~3	~2		
1(a)	P5.06	2	1			3			2	1				
(b)	P5.06			4		4				4				
(c)	P5.06		2	1		10	3				2		1	
2(a)	P6.02/03		2	2			4		2		2			
(b)	P6.05/13	1	4	2		11	7					6	1	
3(a)	P3.22	2					2				2			
(b)	P3.08/20/22		3			5	3					3		
4(a)	P3.18		1	1			2		2					
(b)	P5.02	2				4	2		2					
5(a)	P1.10/31		3					3	3					
(b)	P1.33/34	1	2	2		8	5			3	2			
6	3.08/16/17		3	4		7	7		7					
7(a)	P3.12/13	3	1				4		2		2			
(b)	P4.06		4				4				4			
(c)	P4.07		4				4					3	1	
(d)	P4.09		3			15	3				3			
	Total	11	33	16		60	30	30		20	8	17	12	3

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