

FOR OFFICIAL USE

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Mark

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NATIONAL QUALIFICATIONS 2013

BIOLOGY INTERMEDIATE 1



* X 0 0 7 1 0 0 2 *

WEDNESDAY, 15 MAY
9.00 AM – 10.30 AM

X007/10/02

Fill in these boxes and read what is printed below.

Full name of centre

Town

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Forename(s)

Surname

Number of seat

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Date of birth

Day

Month

Year

Scottish candidate number

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SECTION A (25 marks)

Instructions for completion of Section A are given on page two.

For this section of the examination you must use an **HB pencil**.

SECTION B (50 marks)

- 1 All questions should be attempted.
- 2 The questions may be answered in any order but all answers are to be written in the spaces provided in this answer book, **and must be written clearly and legibly in ink**.
- 3 Additional space for answers will be found at the end of the book. If further space is required, supplementary sheets may be obtained from the Invigilator and should be inserted inside the **front** cover of this book.
- 4 The numbers of questions must be clearly inserted with any answers written in the additional space.
- 5 Rough work, if any should be necessary, should be written in this book and then scored through when the fair copy has been written. If further space is required, a supplementary sheet for rough work may be obtained from the Invigilator.
- 6 Before leaving the examination room you must give this book to the Invigilator. If you do not, you may lose all the marks for this paper.

Use **blue** or **black** ink only.



* X 0 0 7 1 0 0 2 0 1 *

Read carefully

- 1 Check that the answer sheet provided is for **Biology Intermediate 1 (Section A)**.
- 2 For this section of the examination you must use an **HB pencil**, and where necessary, an eraser.
- 3 Check that the answer sheet you have been given has **your name, date of birth, SCN** (Scottish Candidate Number) and **Centre Name** printed on it.
Do not change any of these details.
- 4 If any of this information is wrong, tell the Invigilator immediately.
- 5 If this information is correct, **print** your name and seat number in the boxes provided.
- 6 The answer to each question is **either** A, B, C or D. Decide what your answer is, then, using your pencil, put a horizontal line in the space provided (see sample question below).
- 7 There is **only one correct** answer to each question.
- 8 Any rough working should be done on the question paper or the rough working sheet, **not** on your answer sheet.
- 9 At the end of the examination, put the **answer sheet for Section A inside the front cover of this answer book**.

Sample Question

Which of the following foods contains a high proportion of fat?

- A Butter
- B Bread
- C Sugar
- D Apple

The correct answer is **A**—Butter. The answer **A** has been clearly marked in **pencil** with a horizontal line (see below).



Changing an answer

If you decide to change your answer, carefully erase your first answer and, using your pencil, fill in the answer you want. The answer below has been changed to **D**.



SECTION A

All questions in this section should be attempted.

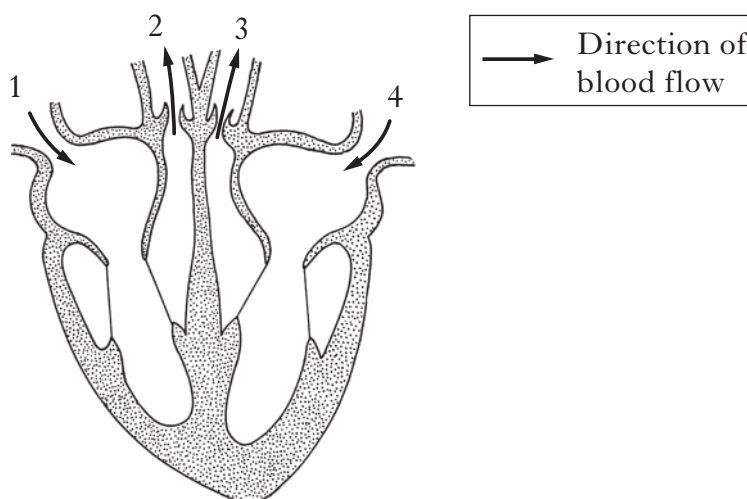
Answers should be given on the separate answer sheet provided.

1. The diagram below shows an instrument used to measure blood pressure.



This instrument is called a

- A pulsometer
 - B stethoscope
 - C digital heart rate monitor
 - D digital sphygmomanometer.
2. The diagram below shows the direction of blood flowing through four blood vessels into and out of the heart.



Which of the blood vessels are veins?

- A 1 and 2
- B 2 and 3
- C 3 and 4
- D 1 and 4



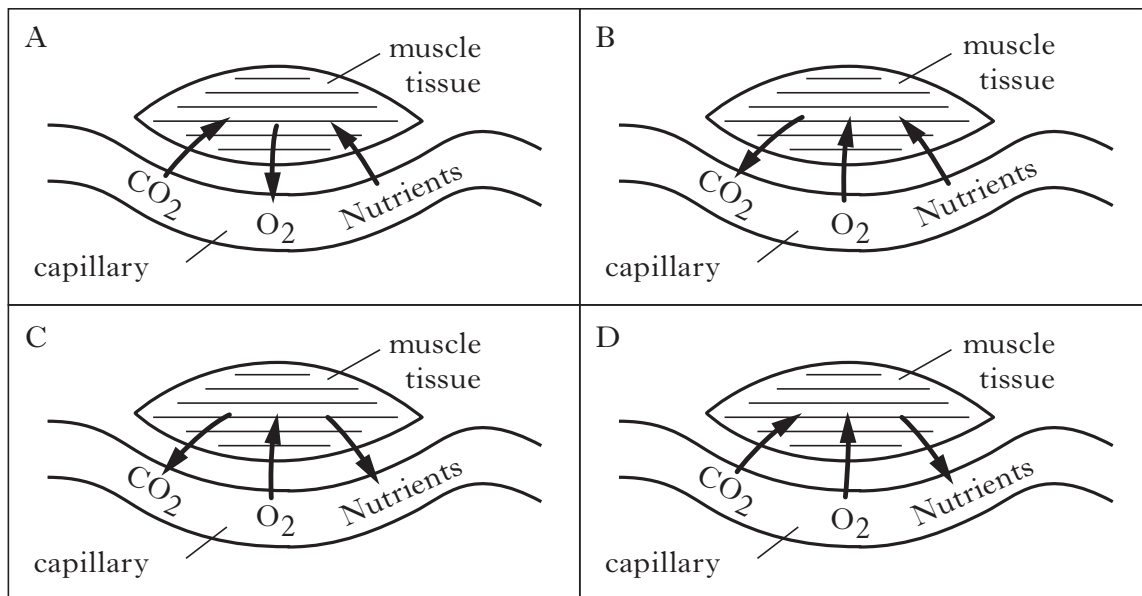
3. The table below shows the blood pressure of four people.

Name	Blood pressure (mm Hg)
Nadia	120/75
Hannah	110/80
Mohammed	165/95
Jack	170/110

Which of these people have high blood pressure?

- A Jack only
- B Jack and Mohammed only
- C Jack, Mohammed and Hannah only
- D All four people

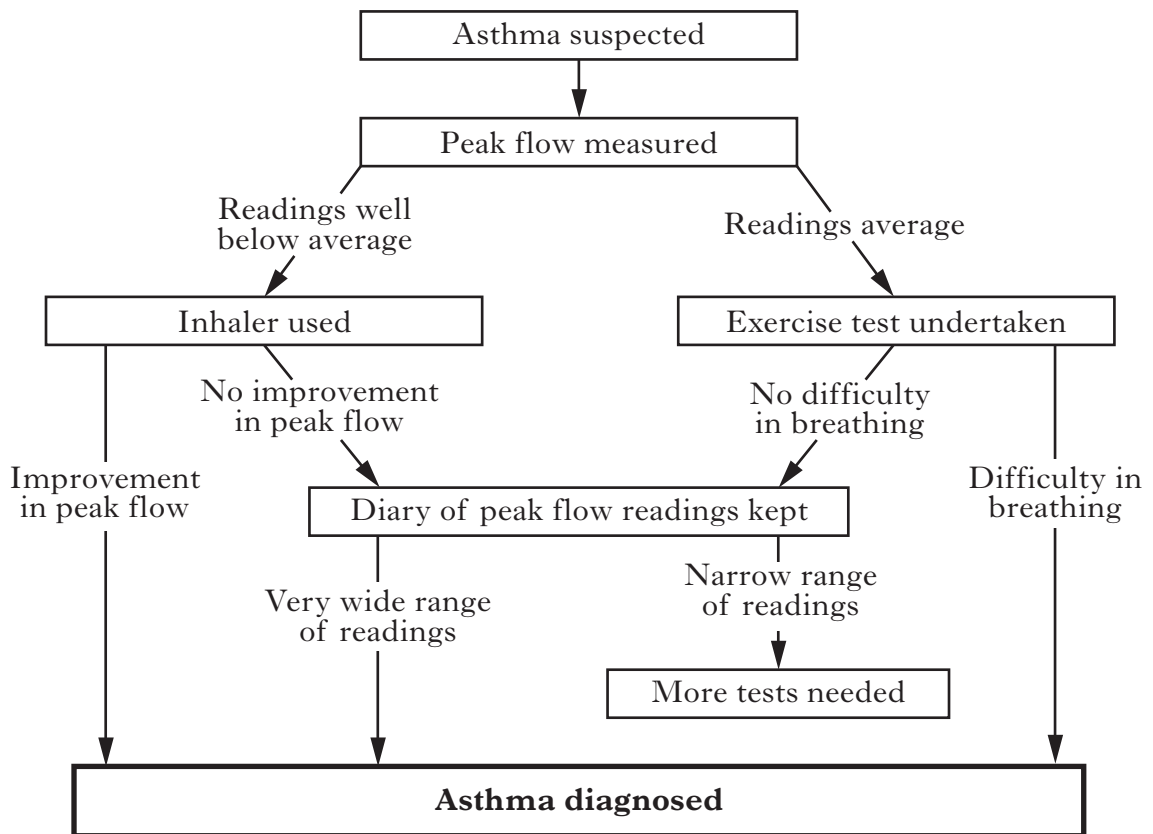
4. Which of the following diagrams shows the movement of carbon dioxide (CO₂), oxygen (O₂) and nutrients between a capillary and muscle tissue?



5. Which line in the table below correctly shows the effect of alcohol on reaction time and muscle control?

<i>Effect of alcohol on</i>		
	<i>reaction time</i>	<i>muscle control</i>
A	shorter	better
B	longer	worse
C	longer	better
D	shorter	worse

6. The chart below gives some information about tests which can be carried out to diagnose if a person has asthma.



If a person's peak flow readings are average, what should be done next?

- A Diary of peak flow readings kept
- B Inhaler used
- C Exercise test undertaken
- D Asthma diagnosed



7. The table below shows the vital capacity of a person at different ages.

<i>Age (years)</i>	<i>Vital capacity (cm³)</i>
20	5000
50	4000

What is the percentage decrease in the vital capacity from age 20 to 50?

- A 20%
- B 25%
- C 80%
- D 1000%
8. The following is a list of chemicals found in cigarette smoke.
Which chemical reduces the ability of the blood to carry oxygen?
- A Carbon monoxide
- B Nicotine
- C Tar
- D Carbon dioxide
9. The following table shows the number of people with four different health conditions.

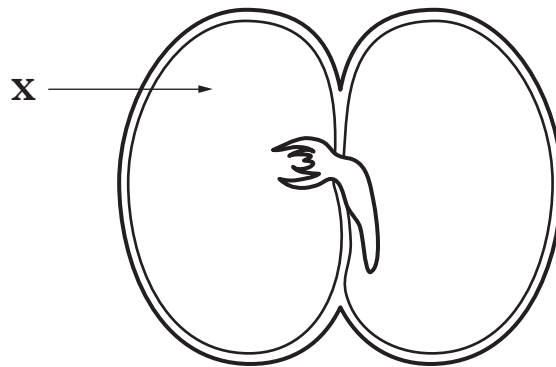
<i>Health condition</i>	<i>Number of people</i>
angina	5
high blood pressure	10
low blood pressure	2
stroke	3

What is the **simplest whole number ratio** of people with high blood pressure compared to those with low blood pressure?

- A 10 : 2
- B 2 : 10
- C 5 : 1
- D 1 : 5



10. The diagram below shows the main parts of a seed.



The part of the seed labelled **X**

- A protects the seed
 - B grows into a new plant
 - C produces food using sunlight
 - D provides energy for the growing plant.
11. The following table shows the mass of a pea seedling at the start of germination and over the following eight days.

<i>Time after the start of germination (days)</i>	<i>Mass of seedling (g)</i>
0	1.8
2	1.7
4	1.4
6	1.2
8	1.6

The greatest **decrease** in mass was between days

- A 0 and 2
- B 2 and 4
- C 4 and 6
- D 6 and 8.

[Turn over]



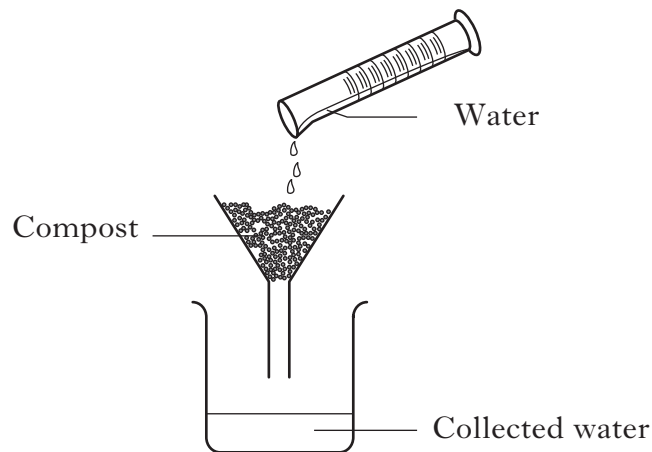
12. One advantage of growing cuttings in a mist propagator is that this reduces

- A water loss
- B root growth
- C humidity
- D leaf surface area.

13. Which line in the following table shows an advantage and a disadvantage of providing heat during propagation?

	<i>Advantage</i>	<i>Disadvantage</i>
A	Reduces water loss	Reduces frost damage
B	Increases energy costs	Increases water loss
C	Reduces frost damage	Reduces growth
D	Increases growth	Increases energy costs

14. The apparatus below was used to investigate the ability of different composts to retain water.



Which variable should be altered during the investigation so that a valid comparison can be made?

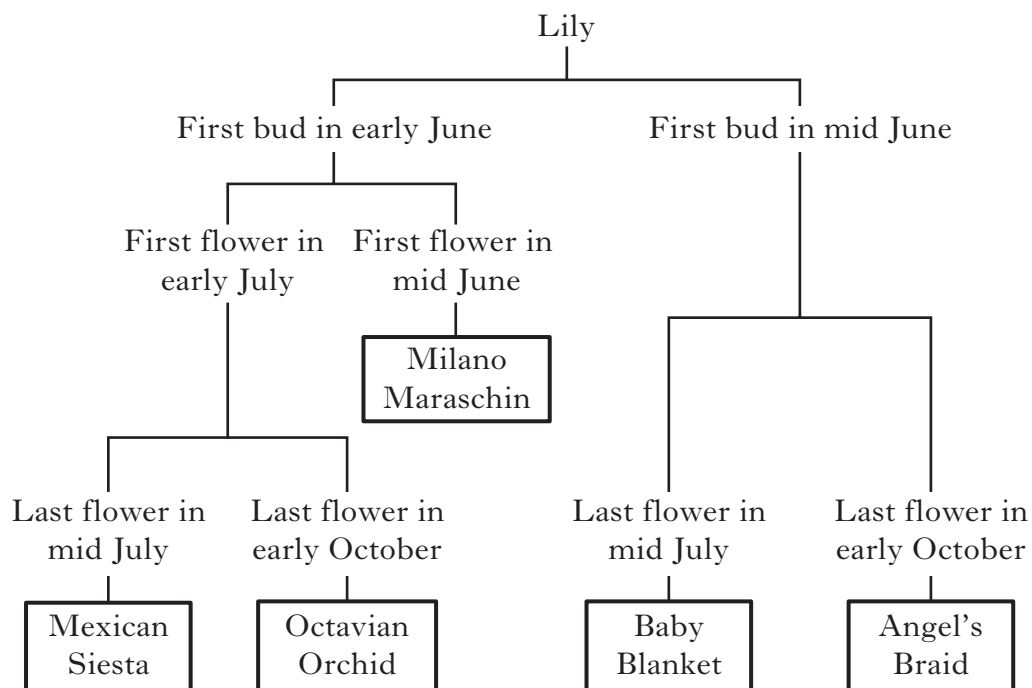
- A Volume of water added
- B Mass of compost
- C Type of compost
- D Time taken to collect water



15. Which of the following would **increase** water retention when added to soil?

- A Peat
- B Nutrients
- C Sand
- D Perlite

16. The key below shows information about five varieties of lily.



Which variety of lily has its last flower appearing in mid July and its first bud appearing in early June?

- A Milano Maraschin
- B Octavian Orchid
- C Mexican Siesta
- D Baby Blanket

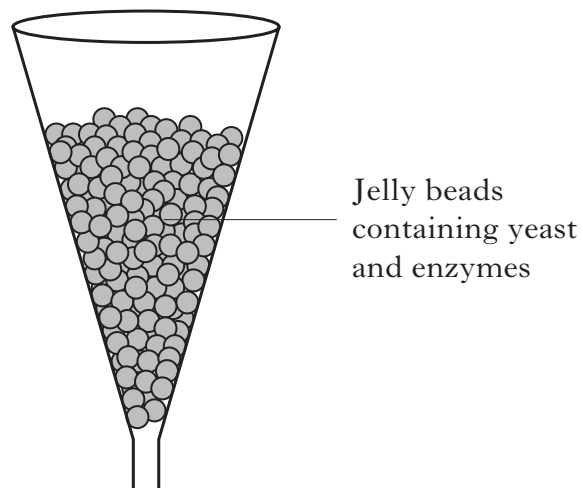
[Turn over



17. The thickening of milk to make yoghurt is caused by bacteria converting

- A protein into acid
- B protein into sugar
- C sugar into acid
- D sugar into protein.

18. The diagram below shows apparatus used to produce a fermented milk drink.



What name is given to the method of trapping the yeast and enzymes in the jelly beads?

- A Fermentation
- B Immobilisation
- C Pasteurisation
- D Separation



19. Heating milk to remove some of the liquid makes it more concentrated.

The type of milk produced by this treatment is

- A evaporated
- B skimmed
- C semi-skimmed
- D UHT.

20. Resazurin dye can be used to test the quality of milk samples.

The table below shows the colour changes for resazurin associated with a range of milk qualities.

<i>Colour of milk sample tested with resazurin</i>	<i>Milk quality</i>
Remains purple	Good
Becomes mauve	Satisfactory
Becomes pink	Poor
Becomes white	Unfit for consumption

When tested with resazurin, a sample of milk changed from purple to pink.

The milk quality was

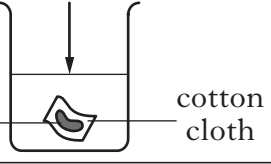
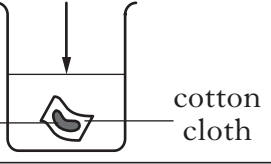
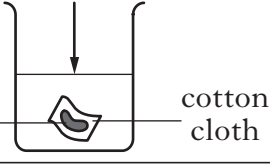
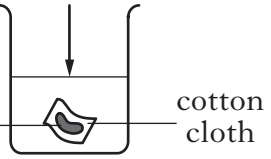
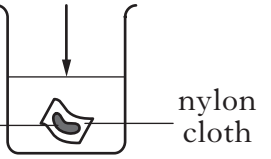
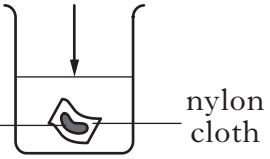
- A satisfactory
- B unfit for consumption
- C poor
- D good.

[Turn over



Questions 21 and 22 refer to the following investigation into the removal of stains by washing powders.

Six beakers were set up as shown below.

<p>1</p> <p>biological powder 40°C</p>  <p>curry stain cotton cloth</p>	<p>2</p> <p>non-biological powder 40°C</p>  <p>curry stain cotton cloth</p>	<p>3</p> <p>biological powder 60°C</p>  <p>curry stain cotton cloth</p>
<p>4</p> <p>non-biological powder 40°C</p>  <p>grass stain cotton cloth</p>	<p>5</p> <p>biological powder 40°C</p>  <p>grass stain nylon cloth</p>	<p>6</p> <p>non-biological powder 40°C</p>  <p>grass stain nylon cloth</p>

21. To investigate the effect of washing powder on the type of stain, **beaker 4** should be compared with

- A beaker 1
- B beaker 2
- C beaker 5
- D beaker 6.

22. Beakers 1 and 2 can be compared to investigate the effect of

- A temperature
- B type of cloth
- C type of stain
- D type of washing powder.

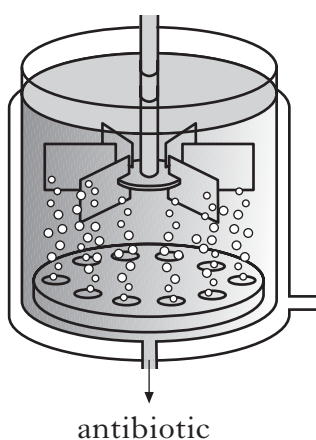


23. Some detergents wash clothes at lower temperatures.

Which line in the following table correctly shows the environmental impact of using these detergents?

	<i>Fuel consumption</i>	<i>Pollution caused by burning fossil fuels</i>
A	increases	increases
B	decreases	decreases
C	increases	decreases
D	decreases	increases

24. The fermenter below is used in the manufacture of antibiotics.



The volume of this fermenter is 700 litres.

The fermenter produces 5 g of antibiotic **per litre** every day.

The total number of grammes of antibiotic produced in **one week** in the fermenter is

- A 700
B 3 500
C 4 900
D 24 500.
25. Why have some bacteria become resistant to antibiotics?
- A The range of antibiotics has increased.
B Antibiotics have been over-used.
C Antibiotics can only be produced by fungi.
D Doctors are prescribing fewer antibiotics.

Candidates are reminded that the answer sheet for Section A MUST be returned inside this answer book.

[Turn over for SECTION B on *Page fourteen*

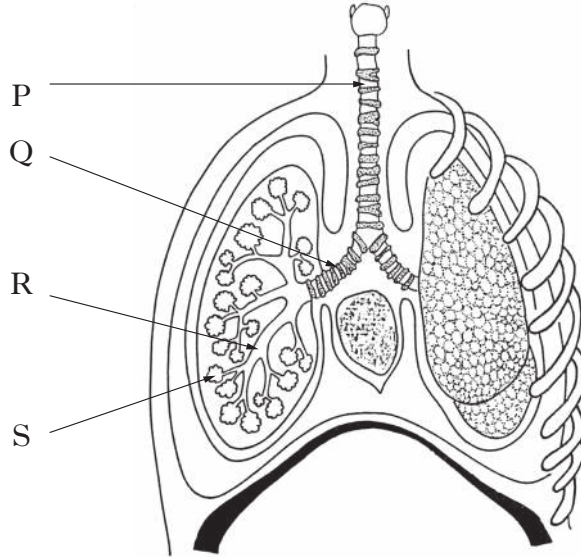


SECTION B

DO NOT
WRITE IN
THIS
MARGIN

**All questions in this Section should be attempted.
All answers must be written clearly and legibly in blue or black ink.**

1. (a) The diagram below shows part of the breathing system.



(i) Name structure R.

_____ 1

(ii) Name the gas which passes into the blood at structure S.

_____ 1

(b) Draw lines to connect each physiological measurement of the lungs to the correct definition.

Physiological measurement

Definition

Vital capacity

maximum volume of air
breathed out in one breath

Tidal volume

maximum rate at which
air can be forced from the
lungs

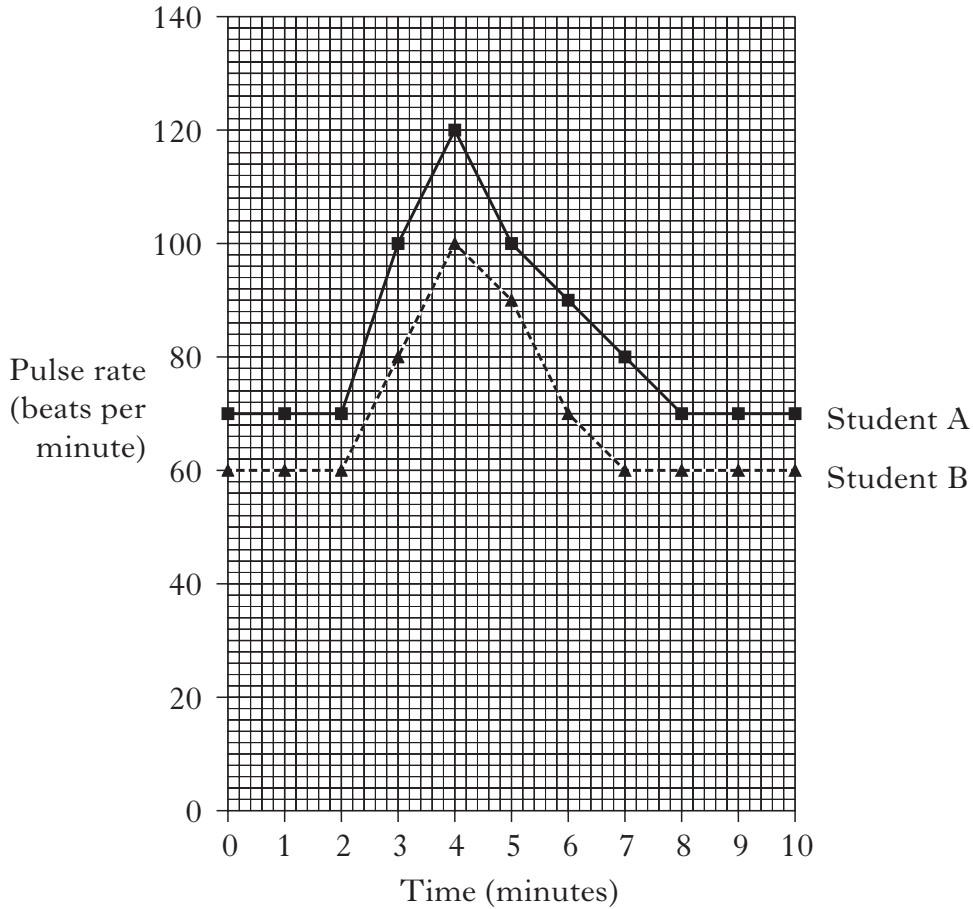
Peak flow

volume of air breathed in
or out of the lungs in one
normal breath

2



2. The graph below shows the pulse rate of two students before, during and after exercise.



- (a) Tick (✓) the box below to show the time period when the students were exercising.

0–2 minutes	<input type="checkbox"/>
0–4 minutes	<input type="checkbox"/>
2–4 minutes	<input type="checkbox"/>
2–8 minutes	<input type="checkbox"/>

1

- (b) State the resting pulse rate of student A.

_____ beats per minute

1

- (c) The two students were the same age, sex and weight. Using information in the graph, state which student is fitter.

Give a reason for your answer.

Fitter student _____

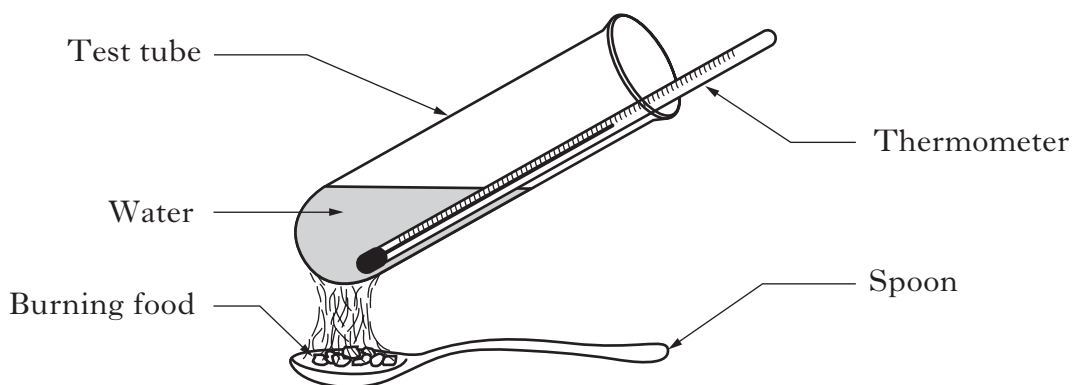
Reason _____

1



Marks

3. (a) The apparatus below was used to investigate the energy released when three foods were burned.



The results are shown in the following table.

Food	Temperature of water (°C)		Rise in temperature (°C)
	At start	At end	
Bread	22	28	6
Cheese	22	35	
Chicken	22		9

- (i) Calculate the two missing temperatures.

Use this information to **complete the table** above.

Space for calculation

1

- (ii) Suggest **one** reason why all the energy in the food was not transferred to the water.

1



Marks

3. (a) (continued)

(iii) Which of the following variables should have been **kept the same** to ensure these results were valid?

Tick (✓) all the correct boxes.

Final temperature of water

Volume of water

Mass of food

Type of food

1

(b) Complete the following table to show the three main food groups and their uses.

<i>Food group</i>	<i>Use</i>
	energy
	growth and repair of cells/tissues
Fat	

2

[Turn over



4. (a) The body temperature of two students was measured as they exercised for two hours.

The results are shown in the table below.

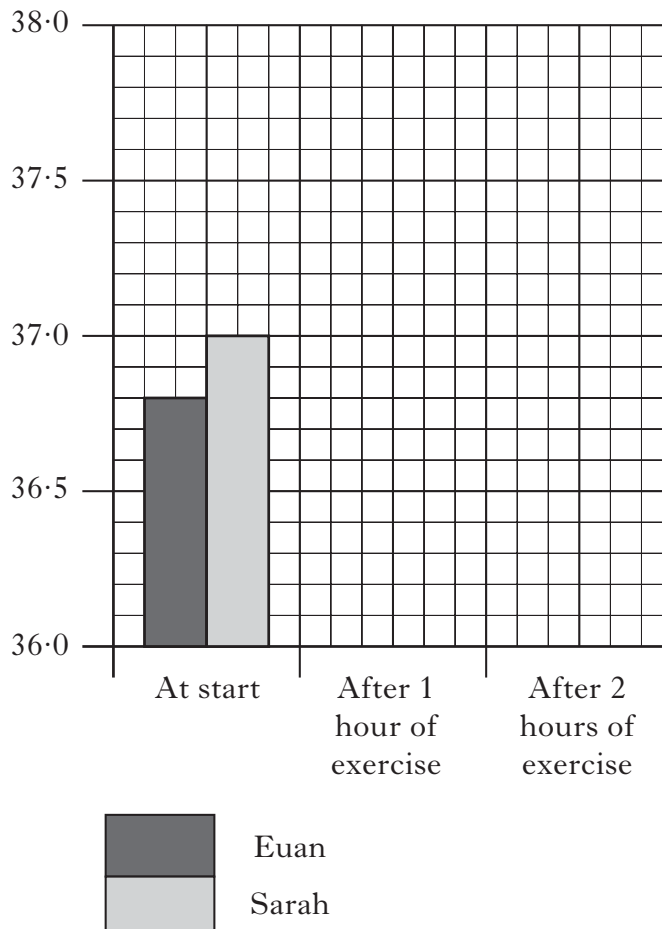
Name of student	Body temperature (°C)		
	At start	After 1 hour of exercise	After 2 hours of exercise
Euan	36.8	37.1	37.4
Sarah	37.0	37.1	37.5

- (i) On the grid below, complete the **bar graph** by:

- 1 providing a label for the vertical axis;
- 2 plotting the remaining results for both students.

1
1

(Additional graph paper, if required, will be found on Page thirty-two.)



Marks

4. (a) (continued)

- (ii) **Underline** one option in each set of brackets to make the sentence below correct.

The student whose body temperature increased more over

2 hours was $\left\{ \begin{array}{l} \text{Euan} \\ \text{Sarah} \end{array} \right\}$ and this student's body temperature

increased by $\left\{ \begin{array}{l} 0.5\text{ }^{\circ}\text{C} \\ 0.6\text{ }^{\circ}\text{C} \end{array} \right\}$.

1

- (b) Name **one high tech** instrument which could be used to measure body temperature.

1

[Turn over



* X 0 0 7 1 0 0 2 1 9 *

5. (a) Read the following passage carefully.

Potato Blight

Blight is a disease that can affect potato plants. Blight is caused by a fungus that is spread through the air during cool, moist weather. The leaves of affected plants first turn black. The potatoes then begin to rot in the soil.

Often the blighted potatoes look normal from the outside. When they are cut in half, however, the inside is black and rotten and cannot be eaten.

In 1845, Ireland's potato crop was badly affected by blight and a third of all potatoes were destroyed, causing famine. Farmers today spray potato plants with chemicals which prevent the disease.



Use the information **in the passage** to answer the following questions.

- (i) Describe the weather conditions which allow the potato blight to spread.

_____ 1

- (ii) What is the first sign of the disease?

_____ 1



Marks

5. (a) (continued)

(iii) Fully describe the appearance of a blighted potato when it is cut in half.

_____ 1

(b) Name the type of chemical which farmers would spray onto potato plants to prevent this type of disease.

_____ 1

(c) Potato tubers are food storage organs.
Name **one** other type of food storage organ.

_____ 1

(d) Name the process by which plants produce food in sunlight.

_____ 1

[Turn over



Marks

6. (a) The table below shows when different varieties of carrot should be sown and when they would be ready to harvest.

<i>Variety</i>	<i>Sown at end of</i>	<i>Ready to harvest during</i>
Dutch Forcing	February	June
Early Nancy	March	July
Perfect Speedy Early	April	July
Perfect Speedy Maincrop	April	August
Saint Verona	May	August
Autumn Gold	June	September
Charlotte Red	July	October

- (i) Name the variety of carrot which should be sown in April and ready to harvest in August.

_____ 1

- (ii) How many varieties of carrot take **more than three months** between sowing and being ready to harvest?

_____ 1

- (b) The table below shows the number of carrot seeds in four different packets.

<i>Packet</i>	<i>Number of seeds</i>
1	1980
2	2030
3	1975
4	2015

Calculate the **average** number of seeds in a packet.

Space for calculation

Average number of seeds _____ 1



Marks

6. (continued)

- (c) Carrot seeds are very small, fine seeds which can be sown more easily by mixing with silver sand.

Describe one other method of sowing small, fine seeds.

1

- (d) Germinating seeds require water.

Name **two other** conditions required by germinating seeds.

1 _____

2 _____

1

[Turn over

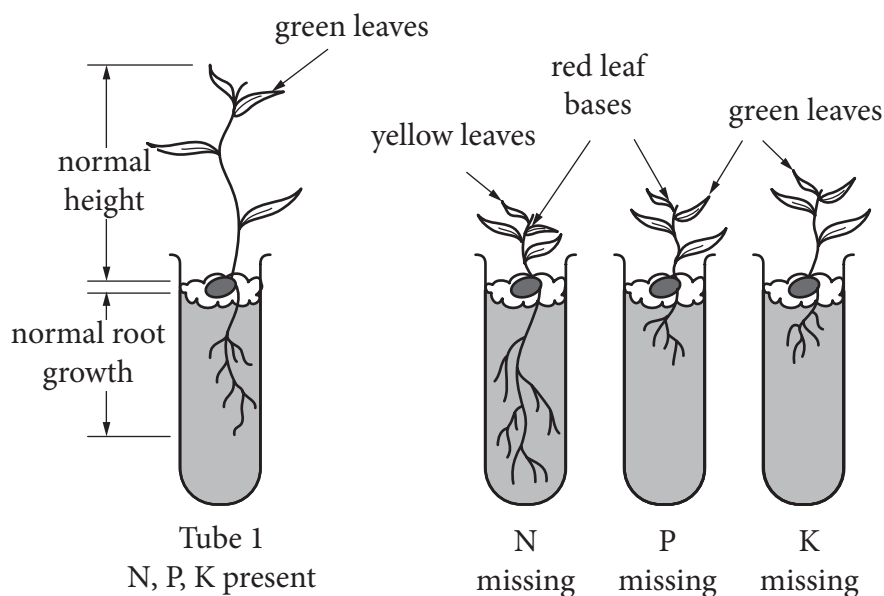


Marks

7. (a) The diagram below shows an investigation into the effect of three minerals, nitrogen (N), phosphorus (P) and potassium (K) on plant growth.

The solution in Tube 1 contained N, P and K.

The other tubes each contained a solution which had one mineral missing.



- (i) What colour are the leaves of a plant grown in a solution containing N, P and K?

_____ 1

- (ii) Describe **two** features of plants grown in a solution with no nitrogen.

Feature 1: _____

Feature 2: _____ 1

- (iii) A plant is found to have red leaf bases and short roots.
The absence of which mineral is likely to cause this effect?

_____ 1

- (iv) Tube 1 is the control.

What was the purpose of including a control in this investigation?

_____ 1



7. (continued)

(b) Various methods are used in maintaining plants.

Decide if each description is **true** or **false** and tick (✓) the appropriate box.

If the description is **false**, write the correct word or phrase in the **correction** box to replace the phrase which is underlined in the definition.

<i>Description</i>	<i>True</i>	<i>False</i>	<i>Correction</i>
<u>Potting on</u> is the removal of dead flowers to encourage further flowering.			
Plants can be protected from low temperatures and wind using <u>automatic fans</u> .			

2

[Turn over



* X 0 0 7 1 0 0 2 2 5 *

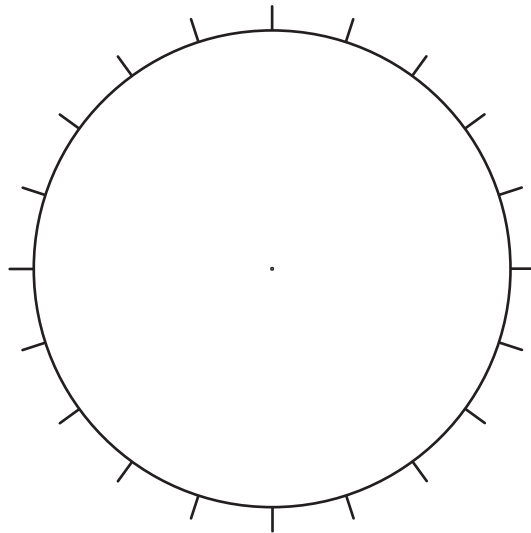
Marks

8. (a) The table below shows information about the health condition of plants in a garden.

<i>Health condition</i>	<i>% plants</i>
Healthy	25
Insect infection	20
Fungal infection	15
Both insect and fungal infection	40

- (i) Use the information in the table to complete and label the pie chart below.

(An additional pie chart, if required, will be found on *Page thirty-three.*)



2

- (ii) In a study of 200 plants, calculate the number which would have any type of infection.

Space for calculation

Number of plants with any type of infection _____ 1

- (b) Name **one** method of controlling insect pests in plants.

_____ 1



Marks

8. (continued)

(c) Fungal infections can also occur in humans.

Name **one** human fungal infection

1

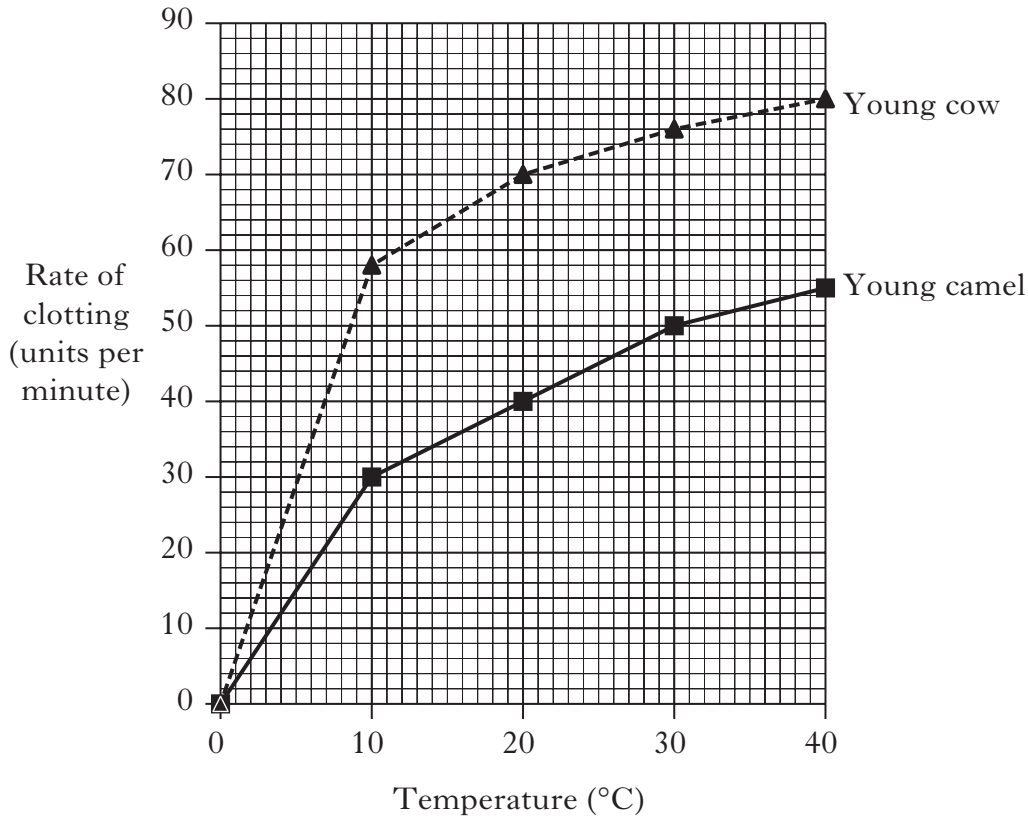
[Turn over



Marks

9. (a) Rennet from the stomach of young cows and camels was used to clot milk at different temperatures.

The graph below shows the rate of milk clotting using rennet from each animal.



- (i) At which temperature is the rate of clotting using young cow rennet 70 units per minute?

_____ °C 1

- (ii) Using information in the graph, state **one** conclusion about the rate of milk clotting using cow and camel rennet.

_____ 1

- (b) Name the solid formed when milk protein clots.

_____ 1



Marks

9. (continued)

- (c) **Underline** one option in each set of brackets to make the sentences below correct.

Disposal of waste whey into rivers results in an increase in the number of bacteria.

This causes the oxygen level in the river to $\left\{ \begin{array}{l} \text{increase} \\ \text{decrease} \end{array} \right\}$ and

the number of other organisms to $\left\{ \begin{array}{l} \text{increase} \\ \text{decrease} \end{array} \right\}$.

1

- (d) Waste whey can be upgraded and used to produce animal feed.

Name **one** other product which can be made by upgrading whey.

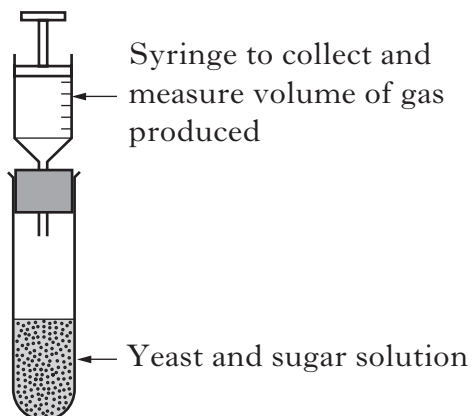
1

[Turn over



10. (a) An investigation was carried out into the effect of temperature on fermentation in yeast.

The volume of gas produced by fermenting yeast at four different temperatures was measured, using the apparatus below.



The results are shown in the table.

	<i>Temperature (°C)</i>			
	15	20	25	30
Volume of gas produced (cm ³)	5	14	23	32



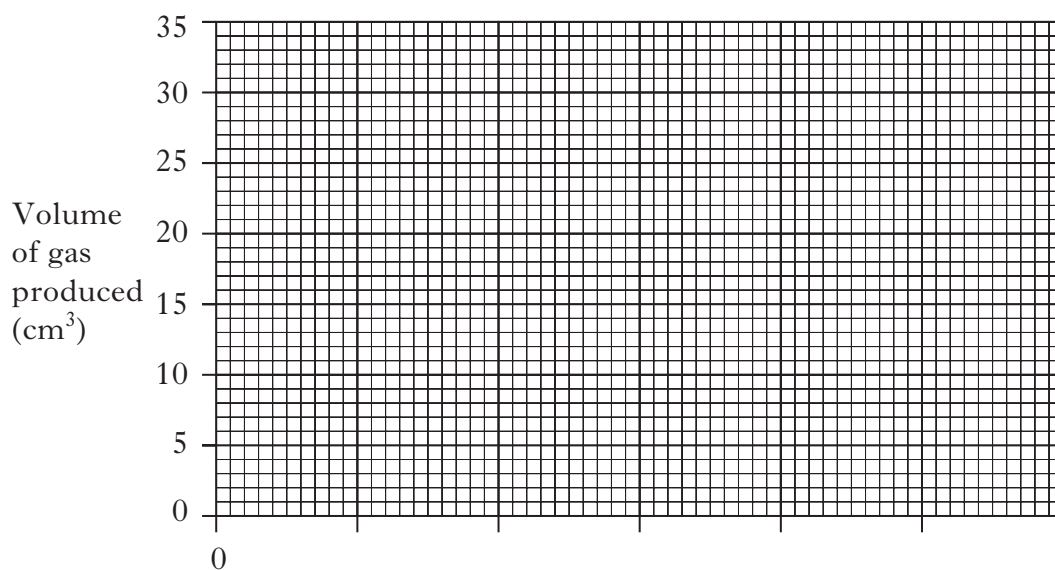
Marks

10. (a) (continued)

(i) On the grid below, complete the **line graph** by:

- | | | |
|---|--|---|
| 1 | putting a scale on the horizontal axis; | 1 |
| 2 | providing a label for the horizontal axis; | 1 |
| 3 | plotting the results. | 1 |

(Additional graph paper, if required, will be found on Page thirty-four.)



(ii) Suggest **one** improvement which would make the results more **reliable**.

_____ 1

(iii) Name the gas produced during fermentation in yeast.

_____ 1

(iv) Name the other substance produced during fermentation.

_____ 1

(b) What type of organism is yeast?

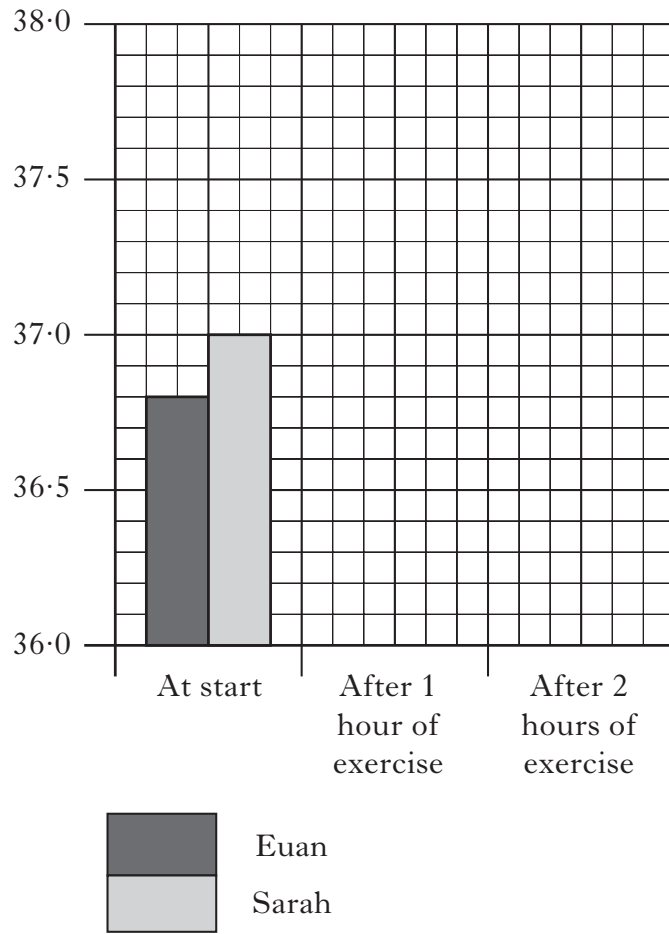
_____ 1

[END OF QUESTION PAPER]



SPACE FOR ANSWERS

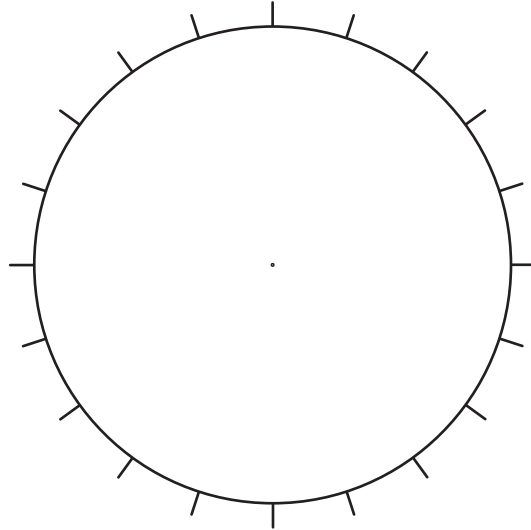
ADDITIONAL GRAPH PAPER FOR QUESTION 4(a)(i)



DO NOT
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SPACE FOR ANSWERS

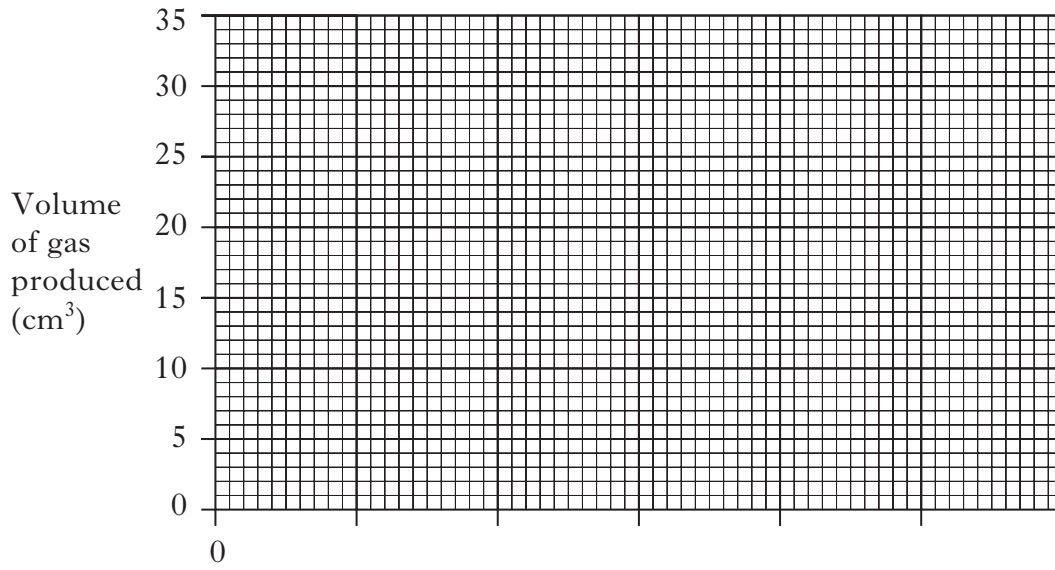
ADDITIONAL GRAPH PAPER FOR QUESTION 8(a)(i)



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ADDITIONAL GRAPH PAPER FOR QUESTION 10(a)(i)



ADDITIONAL SPACE FOR ANSWERS

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ADDITIONAL SPACE FOR ANSWERS

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