

FOR OFFICIAL USE

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KU	PS

Total Marks

0300/401

NATIONAL
QUALIFICATIONS
2005

WEDNESDAY, 18 MAY
9.00 AM – 10.30 AM

BIOLOGY
STANDARD GRADE
General Level

Fill in these boxes and read what is printed below.

Full name of centre

Town

Forename(s)

Surname

Date of birth

Day Month Year

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Scottish candidate number

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Number of seat

- 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 Rough work, if any should be necessary, as well as the fair copy, is to be written in this book. Additional spaces for answers and for rough work will be found at the end of the book. Rough work should be scored through when the fair copy has been written.
- 4 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.



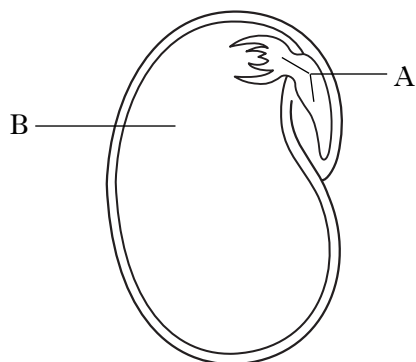
Marks

2. (a) The following table gives the results of an investigation on the factors affecting seed germination.

Test tube	Conditions provided		
	Temperature (°C)	Water present	Oxygen present
1	20	yes	yes
2	20	yes	no
3	20	no	yes
4	0	yes	yes
5	0	no	yes

In which tube(s) would germination occur?

- (b) The diagram shows a section through a seed.



- (i) Name the parts labelled A and B.

A _____

B _____

- (ii) Name the part of a seed which protects the internal structures.

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4. The following sentences refer to food manufacture and transport in plants. Underline **one** alternative in each bracket to make the sentences correct.

(a) Light energy is converted to chemical energy by $\left\{ \begin{array}{l} \text{carbon dioxide} \\ \text{chlorophyll} \end{array} \right\}$.

(b) Food is transported from the leaves in $\left\{ \begin{array}{l} \text{xylem} \\ \text{phloem} \end{array} \right\}$.

(c) The raw materials for photosynthesis are $\left\{ \begin{array}{l} \text{carbon dioxide} \\ \text{oxygen} \end{array} \right\}$ and

$\left\{ \begin{array}{l} \text{glucose} \\ \text{water} \end{array} \right\}$.

(d) Food may be stored in the leaves as $\left\{ \begin{array}{l} \text{glucose} \\ \text{starch} \end{array} \right\}$.

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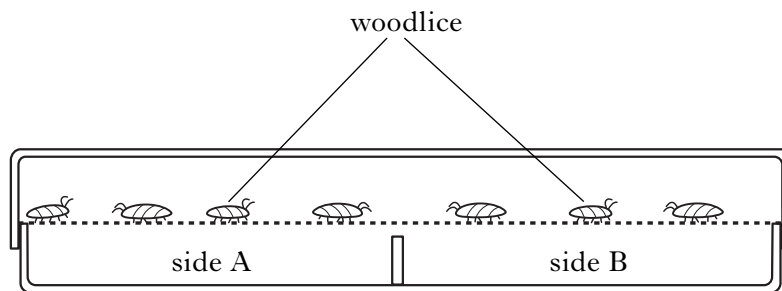
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5. The diagram shows a choice chamber which could be used to investigate the behaviour of woodlice.



- (a) How could the choice chamber be set up to study the effect of light on the behaviour of woodlice?

- (b) (i) Name **one** other abiotic factor which may affect woodlice behaviour that can be investigated using a choice chamber.

- (ii) How could the choice chamber be set up to investigate this other abiotic factor?

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7. (a) The following list contains descriptions of stages in the reproduction of a mammal.

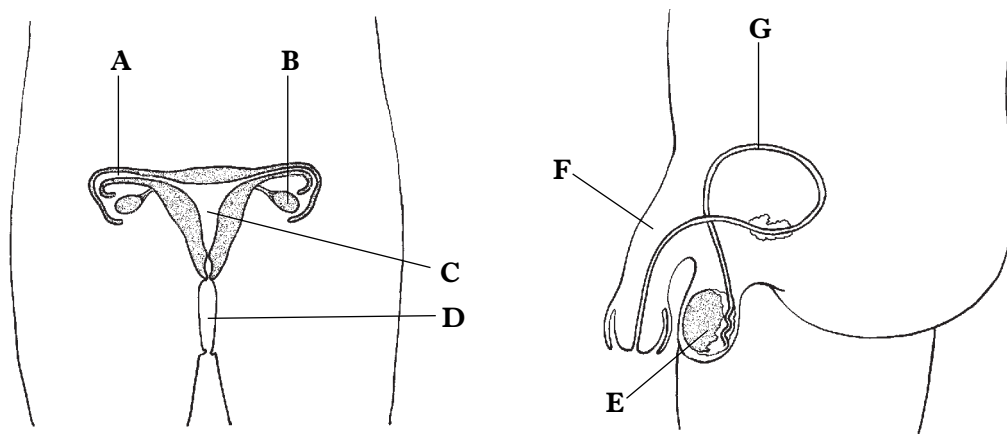
- A A sperm nucleus joins with an egg nucleus.
- B The embryo develops in the amniotic sac.
- C The embryo becomes attached to the uterus wall.
- D A fertilised egg passes down the oviduct.
- E The young animal is born.

Arrange the stages into the correct order by writing the letters into the boxes.



1

(b) The diagrams show the human female and male reproductive systems.



Complete the table below by adding the correct letter, name and function of the parts.

Letter	Name	Function
	ovary	
		where the embryo develops
E		

3

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7. (continued)

- (c) (i) Mammal embryos obtain their food from their mother's blood.
Where do the embryos of fish obtain their food?

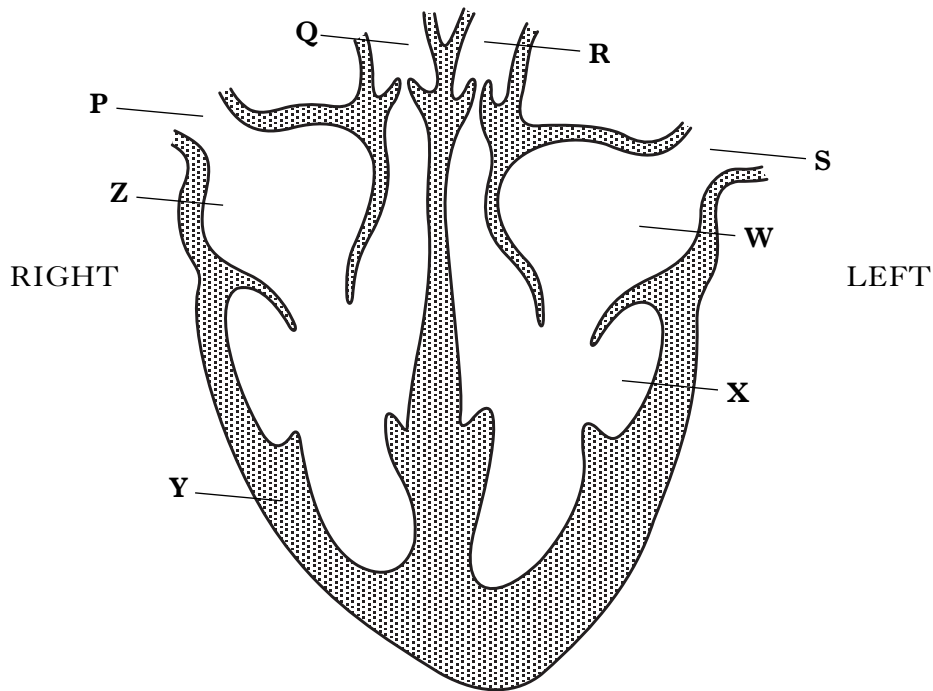
- (ii) Young fish care for themselves.
How are young mammals cared for?

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8. (a) The diagram represents a section through the heart of a mammal.



Use letters from the diagram to identify the following.

(i) The two atria (auricles).

_____ and _____

1

(ii) The vessel which brings blood to the heart from the lungs.

1

(iii) The two vessels which carry deoxygenated blood.

_____ and _____

1

(b) Explain why the wall of the left ventricle is thicker than the wall of the right ventricle.

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9. The pulse rate of an athlete was monitored during a training exercise. The results are shown in the table.

<i>Time (minutes)</i>	0	1	2	3	4	5	6	7	8
<i>Pulse rate (beats per minute)</i>	65	65	90	118	118	118	105	100	80

(a) Complete the line graph of the results by

(i) labelling and adding an appropriate scale to the horizontal axis,

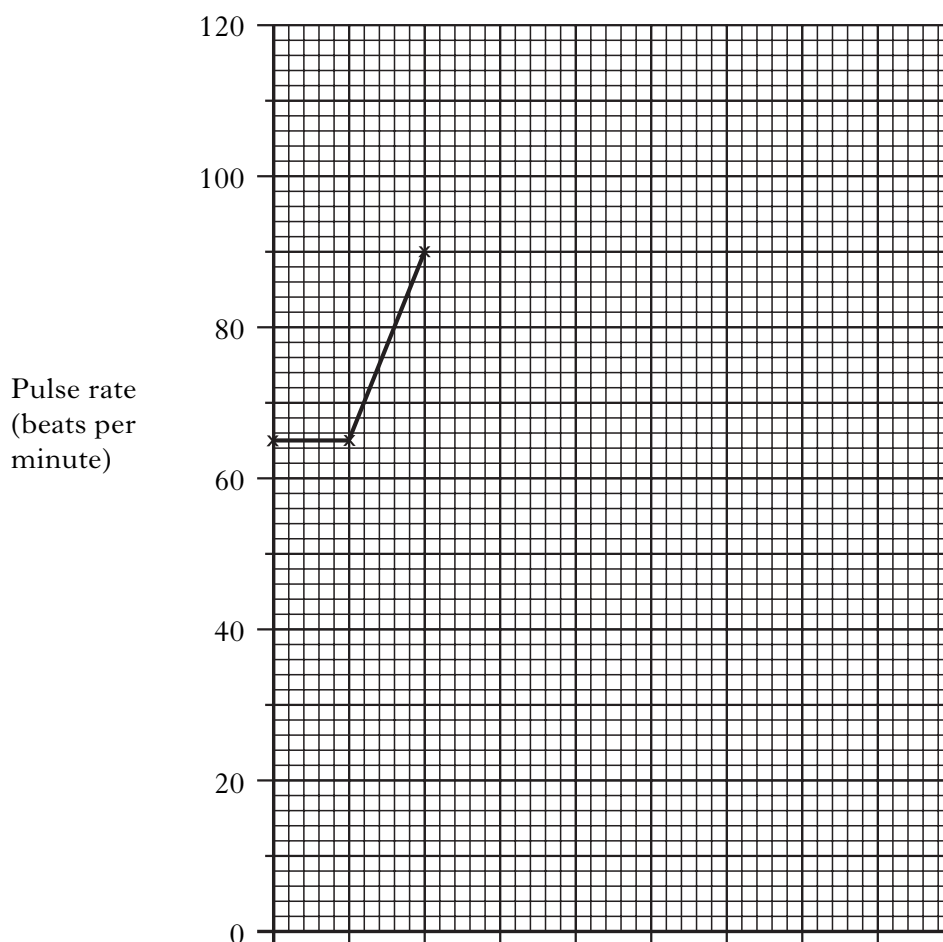
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(ii) plotting the graph.

1

The first three points have been plotted.

(Additional graph paper, if required, will be found on page 31.)



- (b) What evidence suggests that the athlete had not fully recovered at 8 minutes?

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9. (continued)

(c) Suggest an improvement to the procedure to allow the recovery time of the athlete to be measured.

(d) How might the recovery time of the athlete differ from that of an untrained person?

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10. (continued)

(d) At what time of the year are hayfever sufferers likely to be worst affected?

(e) What type of substance is found in treatments prescribed for severe cases of hayfever?

(f) Why are desensitising injections not used very often?

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1	
1	
1	
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1	

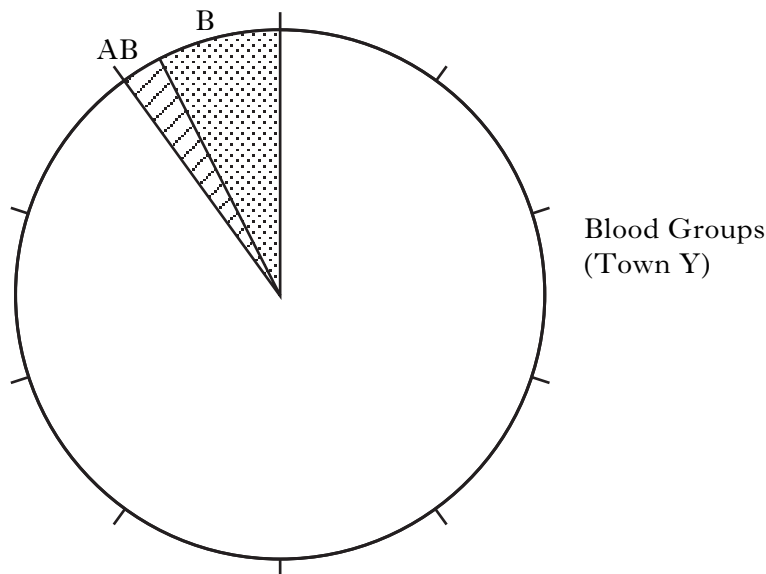
11. (continued)

(b) A similar survey was carried out on a sample of 1000 people in a different town of the same size (Town Y).

There were 20 with group AB, 500 with group A, 400 with group O and 80 with group B.

(i) Complete the pie chart of these results by drawing and labelling the remaining segments.

(An additional chart, if required, will be found on page 31.)



(ii) What percentage of people in the Town Y sample had blood group O?

Space for calculation

_____ %

(c) (i) Select **one** similarity and **one** difference between the results of the surveys for Towns X and Y.

Similarity _____

Difference _____

(ii) Which blood group survey, Town X or Town Y, is the more reliable?

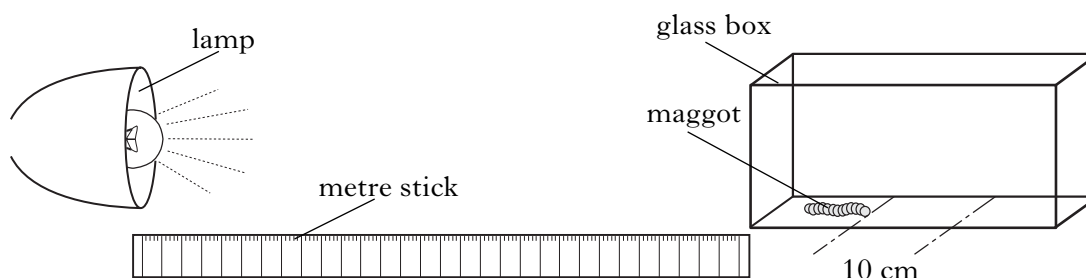
Give a reason for your answer.

Town _____

Reason _____

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12. Maggots move away from light. The effect of different light intensities on the rate of movement was investigated using the apparatus shown below.



The time taken for a maggot to move 10 cm was recorded when the lamp was at different distances from the glass box. The experiment was carried out using three different maggots. The results are shown in the table.

<i>Distance between lamp and box (cm)</i>	<i>Time taken to move 10 cm (seconds)</i>			
	<i>Maggot 1</i>	<i>Maggot 2</i>	<i>Maggot 3</i>	<i>Average</i>
100	30	33	30	31
50	23	24	22	
25	18	20	19	19

- (a) Complete the table with the average time for the maggots to move 10 cm when the lamp was at a distance of 50 cm.

Space for calculation

- (b) Underline **one** option in each bracket to complete the following sentences correctly.

As the distance between the lamp and the glass box decreases, the light

intensity $\left\{ \begin{array}{l} \text{increases} \\ \text{decreases} \\ \text{stays the same} \end{array} \right\}$.

As the light intensity decreases, the time taken for the maggot to move

10 cm $\left\{ \begin{array}{l} \text{increases} \\ \text{decreases} \\ \text{stays the same} \end{array} \right\}$.

- (c) What would happen to the rate of movement of the maggots if they were placed in darkness?

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16. (b) (continued)

(iii) What waste gas will be produced during respiration?

(iv) What form of energy, other than chemical, may be released by the bacterial cells during respiration?

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[Turn over

<i>Marks</i>	KU	PS
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17. A sewage works removes organic material before water is discharged into a river. This is done in two main stages.

Stage 1 Organic solids settle out as sludge which is treated separately.

Stage 2 The remaining liquid is treated with living organisms.

(a) (i) Name **one** useful product which can be made from the treated sludge produced in Stage 1.

(ii) What type of organisms act on the liquid in Stage 2?

(iii) Describe **one** way in which oxygen can be provided for the organisms in Stage 2.

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19. (a) Pollution can affect areas such as fresh water and seas.
Name the **two** other main areas which can be affected by pollution.

1 _____

2 _____

1

(b) Complete the table to show the **three** main sources of pollution and **one** example of a pollutant from each.

<i>Source</i>	<i>Example of pollutant</i>
industry	
	fertilisers
	litter

2

(c) Pollution from the exhausts of vehicles can be a major problem in some cities.

Give **one** way in which this type of pollution can be controlled.

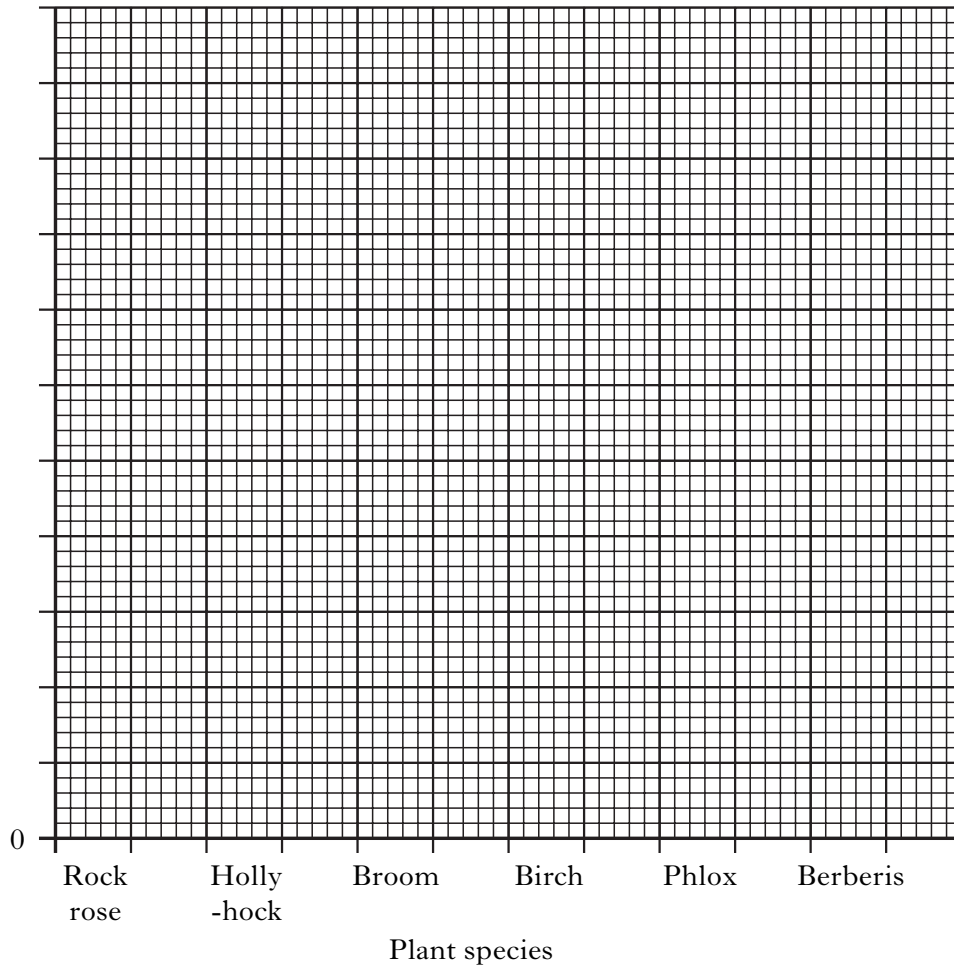
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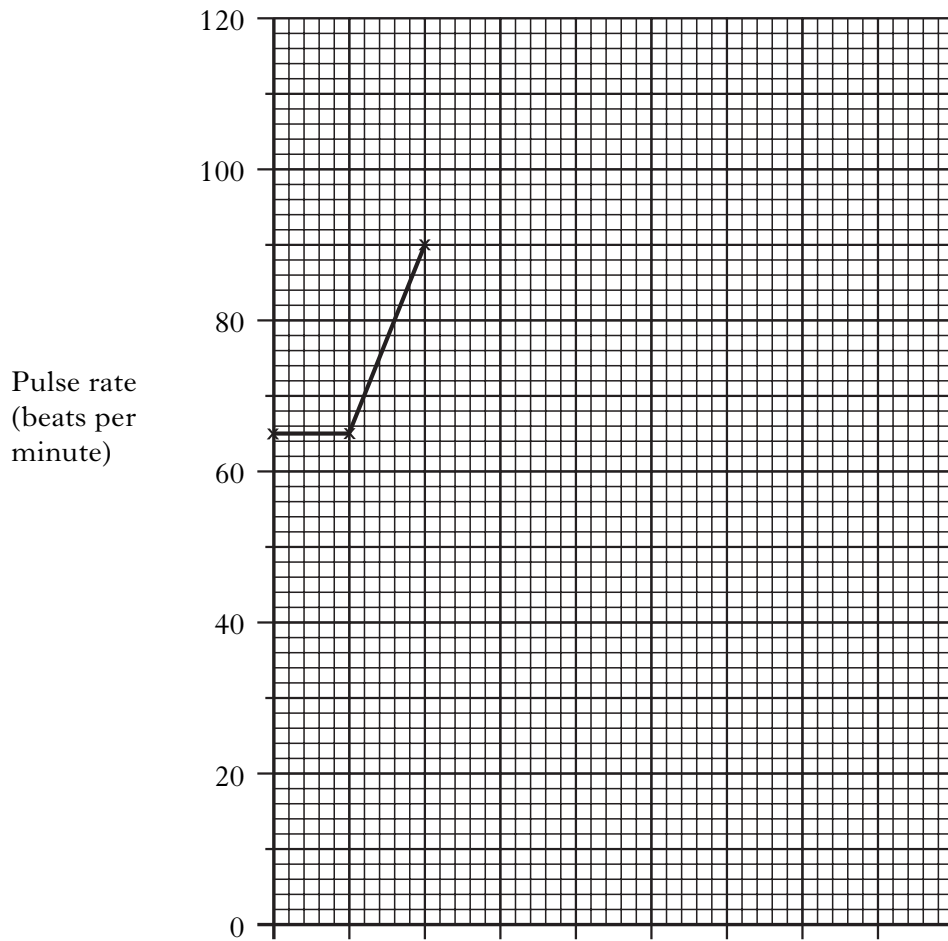
SPACE FOR ANSWERS
AND FOR ROUGH WORKING

ADDITIONAL GRID FOR QUESTION 2(c)

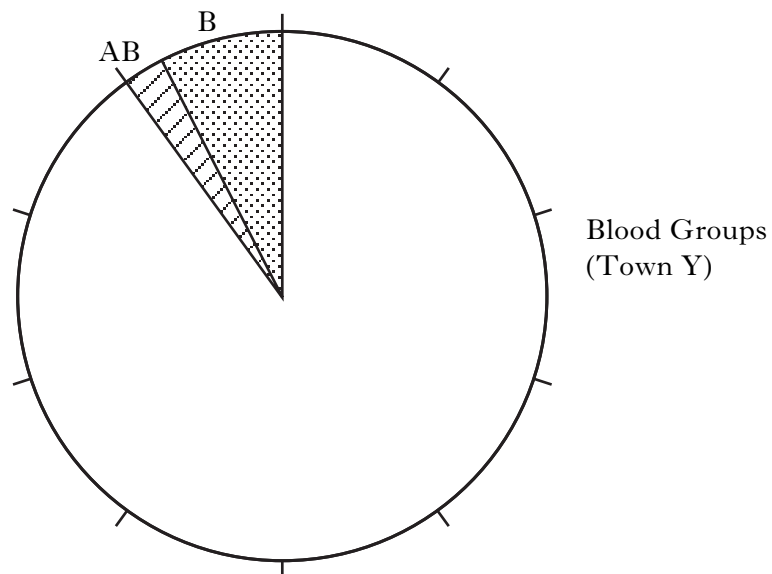


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AND FOR ROUGH WORKING

ADDITIONAL GRID FOR QUESTION 9(a)



ADDITIONAL GRID FOR QUESTION 11(b)(i)



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AND FOR ROUGH WORKING