



National
Qualifications
SPECIMEN ONLY

S807/75/02

Biology
Section 1 — Questions

Date — Not applicable

Duration — 2 hours

Instructions for completion of Section 1 are given on *page 02* of your question and answer booklet S807/75/01.

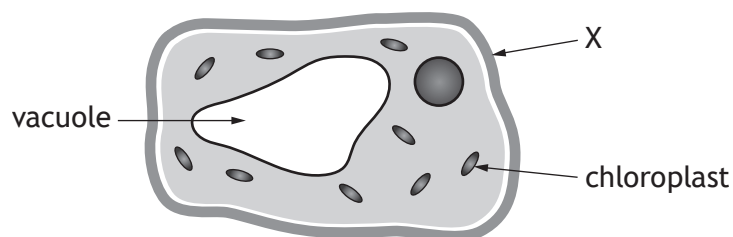
Record your answers on the answer grid on *page 03* of your question and answer booklet.

You must leave your answer booklet on your desk; if you do not, you could lose all the marks for this paper.



SECTION 1

1. The diagram shows a single cell.



The structure labelled X is made of

- A starch
 - B phospholipid
 - C protein
 - D cellulose.
2. The following statements relate to the transport of molecules across membranes:
- 1. Energy is required.
 - 2. Molecules move from an area of high concentration to an area of low concentration.
 - 3. Membrane proteins are involved.

Which of the statements apply to active transport?

- A 1 and 2 only
 - B 1 and 3 only
 - C 2 and 3 only
 - D 1, 2 and 3
3. Where in a cell would mRNA **not** be found?
- A Cell membrane
 - B Cytoplasm
 - C Nucleus
 - D Ribosome

4. An experiment was carried out into the effect of pH on the breakdown of hydrogen peroxide.



A piece of liver was added to a measuring cylinder containing hydrogen peroxide and pH buffer. The catalase activity was determined by measuring the volume of foam produced. The results are shown in the table.

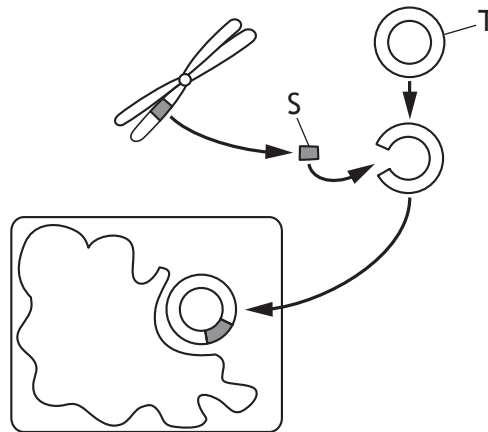
pH	Volume of foam produced (cm ³)
7	12
8	29
9	61
10	32

The reliability of the results could be improved by

- A including a control measuring cylinder with no pH buffer
- B carrying out the experiment 3 times at each pH
- C using a wider range of pH values
- D using the same volumes of hydrogen peroxide and pH buffer in each measuring cylinder.

[Turn over

5. The diagram shows stages in the production of a substance by genetic engineering.

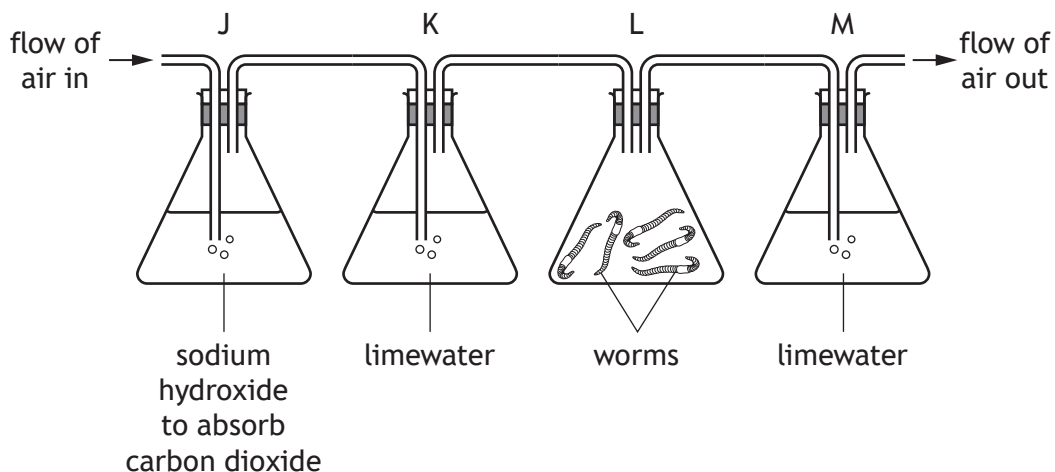


Which row in the table identifies S and T?

	S	T
A	gene	plasmid
B	gene	bacterium
C	chromosome	plasmid
D	chromosome	bacterium

6. The diagram shows the apparatus set up by a student to investigate the rate of carbon dioxide production during respiration.

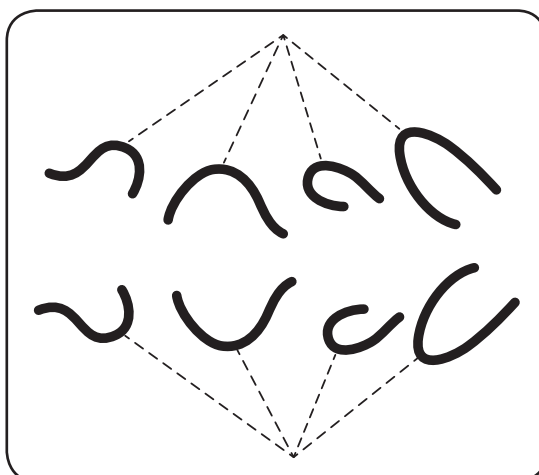
Limewater turns increasingly cloudy as more carbon dioxide is passed through it.



Predict what would happen if there was only one worm in flask L. The limewater in flask

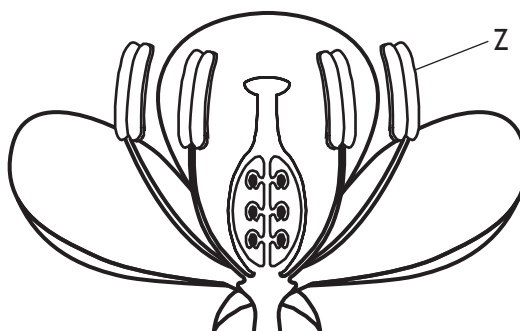
- A K would turn cloudy more slowly
- B K would turn cloudy more quickly
- C M would turn cloudy more slowly
- D M would turn cloudy more quickly.

7. The diagram shows one of the stages of mitosis.



Which of the following statements describes the next stage of mitosis?

- A Chromosomes move to the equator of the cell.
 - B Spindle fibres pull chromatids to opposite poles.
 - C Chromosomes become visible as pairs of identical chromatids.
 - D Chromosomes are pulled to opposite poles as spindle fibres contract.
8. The diagram shows some of the main parts of a flower.



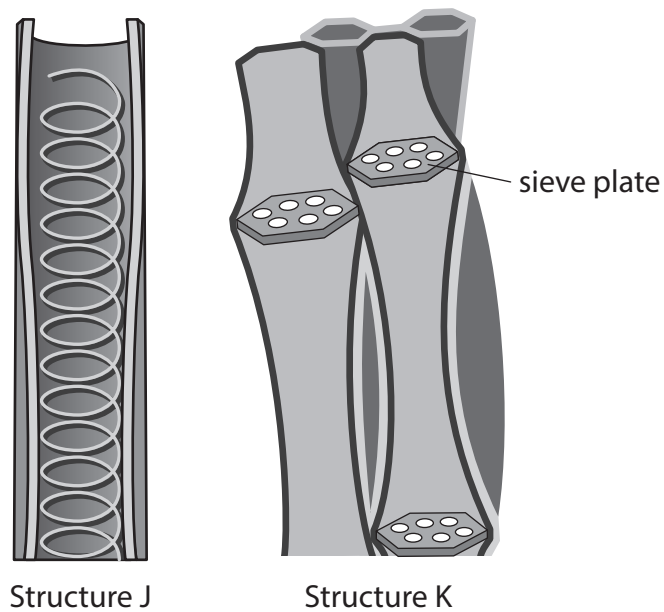
Which row in the table identifies structure Z and the chromosome complement of the cells it produces?

	Structure Z	Chromosome complement of cells produced
A	anther	diploid
B	anther	haploid
C	pollen	haploid
D	pollen	diploid

9. Which term describes the type of variation in which a characteristic is controlled by more than one gene?

- A Continuous
- B Discrete
- C Polygenic
- D Heterozygous

10. The diagram shows some of the structures involved in transport in plants.



Which row in the table identifies structures J and K, and the substances transported by them?

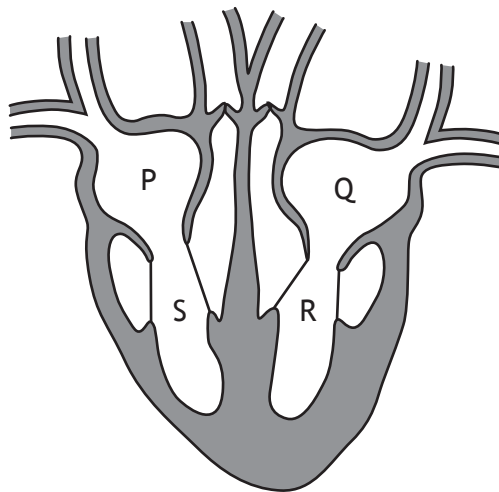
	Structure J		Structure K	
	Name	Substance transported	Name	Substance transported
A	xylem	water	phloem	sugar
B	xylem	sugar	phloem	water
C	phloem	water	xylem	sugar
D	phloem	sugar	xylem	water

11. The table shows the composition of some of the gases in inhaled and exhaled air.

Gas	Gas composition (%)	
	Inhaled air	Exhaled air
Oxygen	20	16
Carbon dioxide	0.04	4

How many times greater is the carbon dioxide concentration in exhaled air than in inhaled air?

- A 500
B 100
C 3.96
D 0.16
12. The diagram represents the human heart.

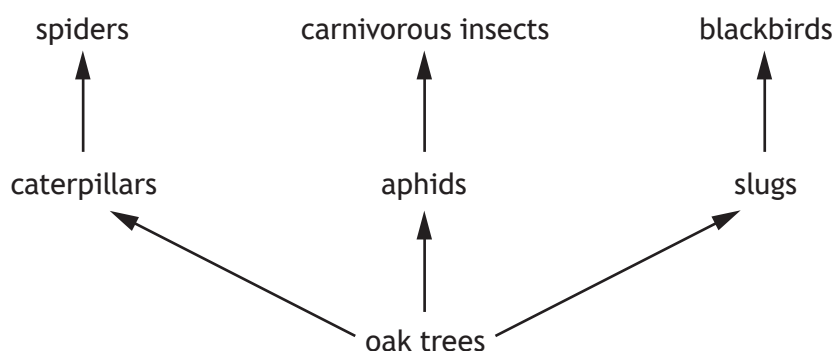


Starting where **oxygenated** blood first enters the heart, identify the order of blood flow through the heart.

- A $Q \rightarrow R \rightarrow S \rightarrow P$
B $P \rightarrow S \rightarrow R \rightarrow Q$
C $Q \rightarrow R \rightarrow P \rightarrow S$
D $P \rightarrow S \rightarrow Q \rightarrow R$

[Turn over

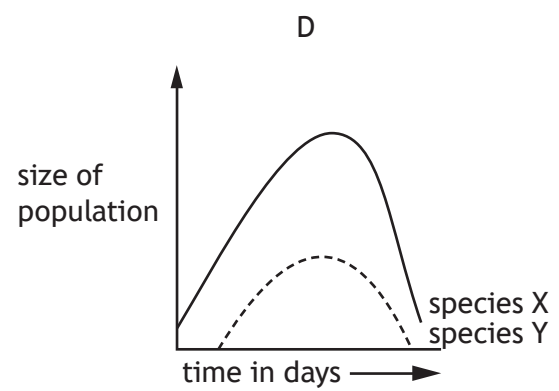
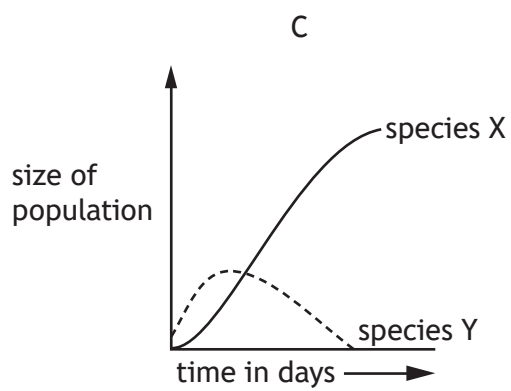
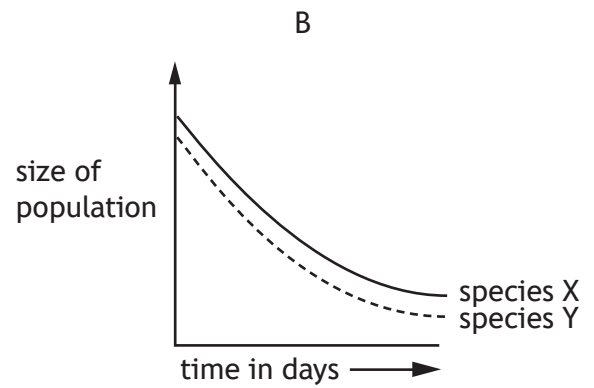
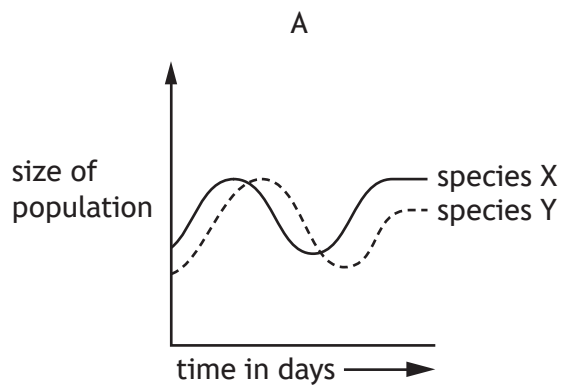
13. Nutrients from food are absorbed into the villi in the small intestine. Which of the following statements is correct?
- A Glucose and amino acids are absorbed into the capillaries.
 - B Glucose and fatty acids are absorbed into the lacteals.
 - C Glycerol and amino acids are absorbed into the lacteals.
 - D Glycerol and fatty acids are absorbed into the capillaries.
14. Which of the following statements about a woodland describes a community?
- A All the oak trees.
 - B All the plants.
 - C All the oak trees and blackbirds.
 - D All the plants and animals.
15. The diagram shows part of a food web in an oak woodland.



The use of pesticides in a nearby field resulted in the death of most aphids and caterpillars. Which row in the table identifies the effect on the numbers of slugs and carnivorous insects?

	Number of slugs	Number of carnivorous insects
A	increases	stays the same
B	decreases	increases
C	decreases	stays the same
D	increases	decreases

16. Which of the following graphs shows the effects of competition for the same food between a successful species and an unsuccessful species?

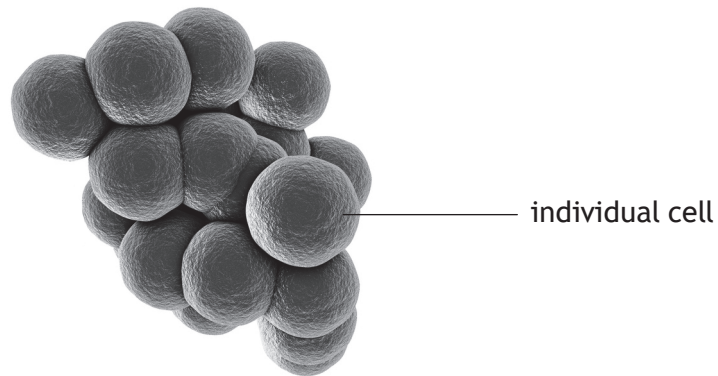


[Turn over

17. The following paired-statement key can be used to identify bacteria.

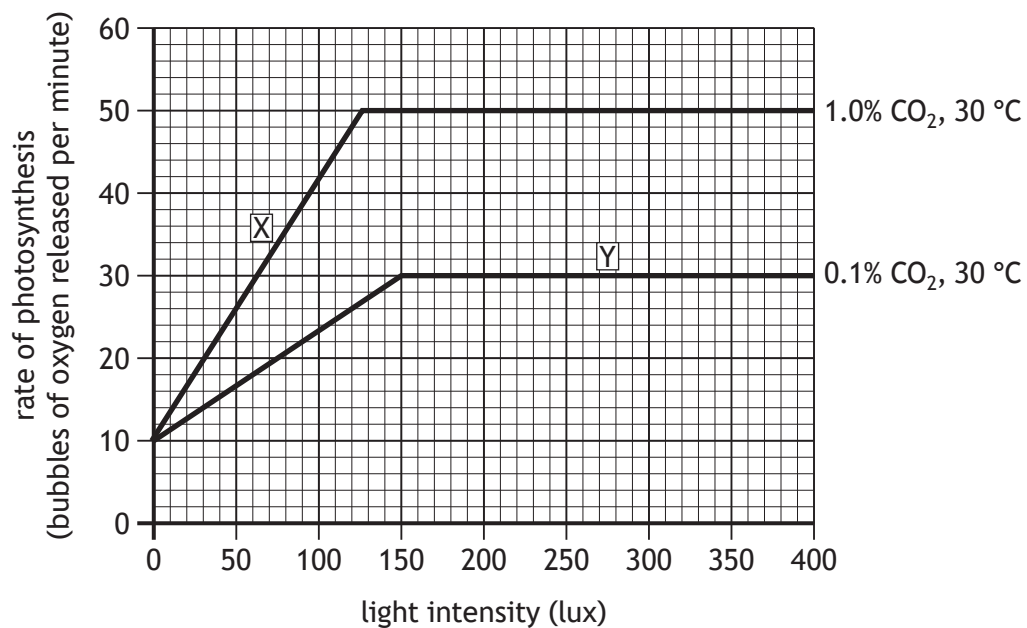
- | | | |
|---|--|------------------------|
| 1 | Individual cells are spherical in shape | go to 2 |
| | Individual cells are rod-shaped | go to 3 |
| 2 | Cells are arranged in a single chain | <i>Streptococcus</i> |
| | Cells are not arranged in a single chain | go to 4 |
| 3 | Cells are arranged in a single chain | <i>Streptobacillus</i> |
| | Cells are not arranged in a single chain | <i>Clostridium</i> |
| 4 | Cells are arranged in pairs | <i>Diplococcus</i> |
| | Cells are arranged in groups | <i>Staphylococcus</i> |

Use the key to identify the bacteria shown.



- A *Staphylococcus*
- B *Streptococcus*
- C *Diplococcus*
- D *Clostridium*

18. The graph shows the effect of limiting factors on the rate of photosynthesis.

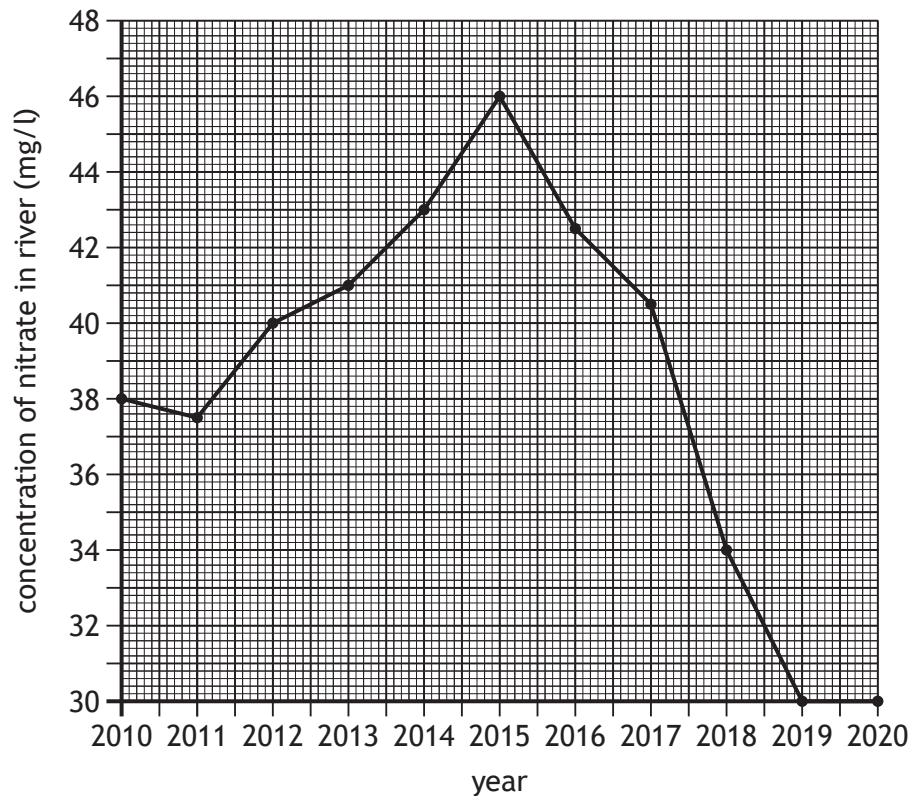


Which row in the table identifies the limiting factors at points X and Y on the graph?

	X	Y
A	light intensity	temperature
B	light intensity	CO ₂ concentration
C	temperature	light intensity
D	CO ₂ concentration	light intensity

[Turn over

19. The graph shows the concentration of nitrate in a river measured on the 1st January each year.



A valid conclusion from this data would be:

- A nitrate concentration increased every year between 2010 and 2014
- B there was a greater increase in nitrate concentration between 2011–2012 compared to between 2014–2015
- C no nitrates were present in river water between 2019 and 2020
- D the greatest decrease in nitrate concentration was between 2017 and 2018.

20. The following three processes occur during speciation.

- 1 Mutation
- 2 Natural selection
- 3 Isolation

The order in which they occur is

- A 3, 2, 1
- B 1, 2, 3
- C 3, 1, 2
- D 2, 3, 1.

[END OF SECTION 1. NOW ATTEMPT THE QUESTIONS IN SECTION 2
OF YOUR QUESTION AND ANSWER BOOKLET]

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Mark

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S807/75/01**Biology**
Section 1 — Answer grid
and Section 2

Date — Not applicable

Duration — 2 hours



* S 8 0 7 7 5 0 1 *

Fill in these boxes and read what is printed below.

Full name of centre

--

Town

--

Forename(s)

--

Surname

--

Number of seat

--

Date of birth

Day

--	--

Month

--	--

Year

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Scottish candidate number

--	--	--	--	--	--	--	--	--	--

Total marks — 80**SECTION 1 — 20 marks**

Attempt ALL questions.

Instructions for completion of Section 1 are given on *page 02*.**SECTION 2 — 60 marks**

Attempt ALL questions.

Write your answers clearly in the spaces provided in this booklet. Additional space for answers and rough work is provided at the end of this booklet. If you use this space you must clearly identify the question number you are attempting. Any rough work must be written in this booklet. Score through your rough work when you have written your final copy.

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

Do not remove any exam materials. You must leave this booklet on your desk; if you do not, you could lose all the marks for this paper.



* S 8 0 7 7 5 0 1 0 1 *

SECTION 1 — 20 marks

The questions for Section 1 are contained in the question paper S807/75/02.

Read these and record your answers on the answer grid on *page 03*.

Use **blue** or **black** ink. Do NOT use gel pens or pencil.

1. The answer to each question is **either** A, B, C or D. Decide what your answer is, then fill in the appropriate bubble (see sample question below).
2. There is **only one correct** answer to each question.
3. Any rough working should be done on the additional space for answers and rough work at the end of this booklet.

Sample Question

The thigh bone is called the

- A humerus
- B femur
- C tibia
- D fibula.

The correct answer is **B** — femur. The answer **B** bubble has been clearly filled in (see below).

A	B	C	D
☐	☒	☐	☐

Changing an answer

If you decide to change your answer, cancel your first answer by putting a cross through it (see below) and fill in the answer you want. The answer below has been changed to **D**.

A	B	C	D
☐	☒	☐	☒

If you then decide to change back to an answer you have already scored out, put a tick (✓) to the **right** of the answer you want, as shown below:

A	B	C	D
☐	☒ ✓	☐	☒

 or

A	B	C	D
☐	☒ ✓	☐	☐



SECTION 1 — Answer Grid



	A	B	C	D
1	☐	☐	☐	☐
2	☐	☐	☐	☐
3	☐	☐	☐	☐
4	☐	☐	☐	☐
5	☐	☐	☐	☐
6	☐	☐	☐	☐
7	☐	☐	☐	☐
8	☐	☐	☐	☐
9	☐	☐	☐	☐
10	☐	☐	☐	☐
11	☐	☐	☐	☐
12	☐	☐	☐	☐
13	☐	☐	☐	☐
14	☐	☐	☐	☐
15	☐	☐	☐	☐
16	☐	☐	☐	☐
17	☐	☐	☐	☐
18	☐	☐	☐	☐
19	☐	☐	☐	☐
20	☐	☐	☐	☐

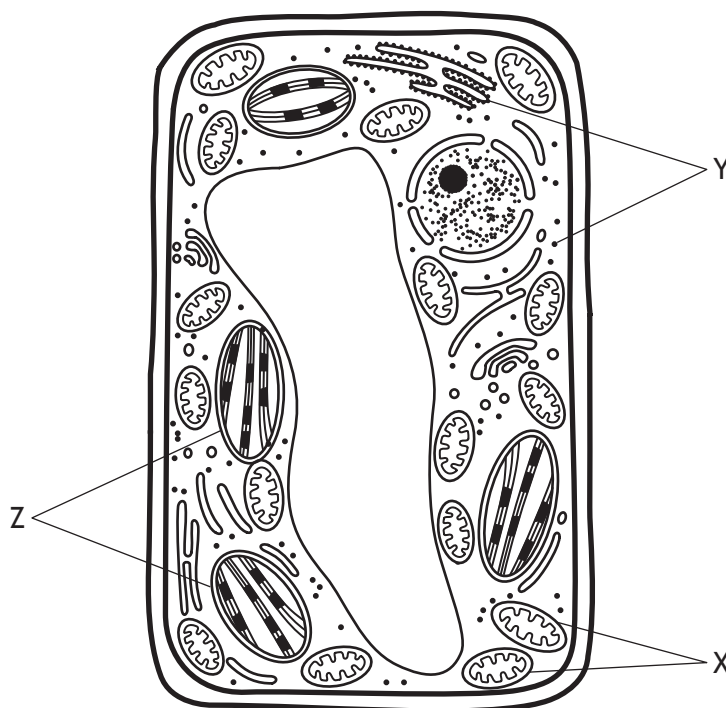


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1. A variegated leaf contains green areas and white areas.
A student investigated cells from both areas.
The diagram represents one of these cells.



- (a) Which letter identifies ribosomes?

1

- (b) Using evidence from the diagram, explain why this cell can produce large quantities of ATP.

1

- (c) The student concluded that this cell is from the green area.
Explain why this conclusion is correct.

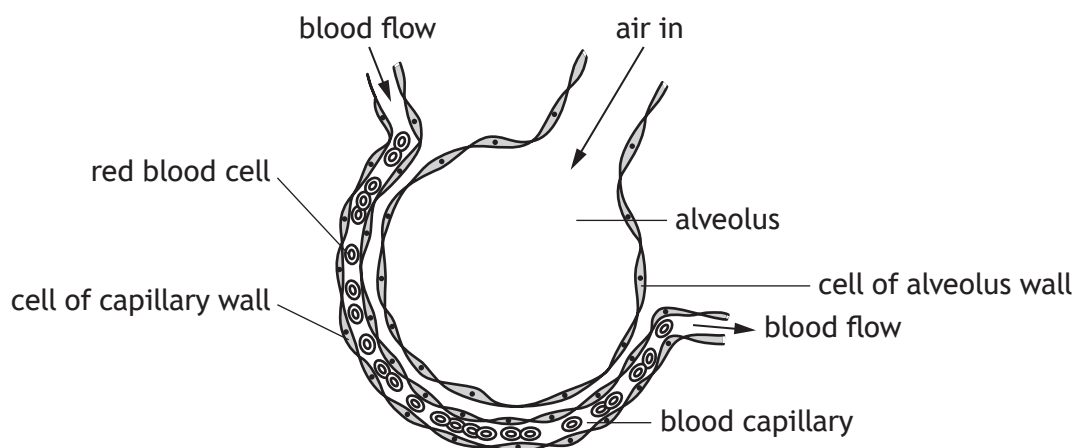
2

[Turn over



* S 8 0 7 7 5 0 1 0 5 *

2. The diagram shows a site of gas exchange in the lungs.



The table shows the relative concentration of oxygen, carbon dioxide and water in three cell types.

Cell Type	Relative concentration of substances		
	Oxygen	Carbon dioxide	Water
Red blood cell	low	high	medium
Cell of capillary wall	medium	medium	medium
Cell of alveolus wall	high	low	medium

- (a) (i) Describe the pathway that oxygen would take when moving between these cell types. 1

- (ii) Explain why oxygen moves along this pathway. 1

- (b) Osmosis would not occur between the cells of the capillary wall and the cells of the alveolus wall. 1

Using all the information provided, explain why this is the case.

3. The diagram represents a section of DNA.



- (a) (i) Give the term used to describe the structure of a DNA molecule. 1

- (ii) Name the type of molecule coded for by a section of DNA. 1

- (b) Part of the base sequence is shown.

----- G C A T A T A G A -----

The sequence shown is only 5% of the bases in this strand.

Calculate the total number of bases in this DNA strand. 1

Space for calculation

_____ bases

[Turn over



4. A study was carried out into the percentage of amino acids present in the blood of people with different diets.

One group tested were meat eaters and the other group were vegetarians.

In both groups, samples were analysed to show the percentage of amino acids in their food and in their blood after digesting the food.

The results are shown in the table.

Amino acid	Amino acid present (%)			
	Meat eaters		Vegetarians	
	In food	In blood	In food	In blood
Arginine	5.5	1.6	6.4	1.4
Leucine	8.0	5.4	7.0	5.0
Lysine	6.4	6.4	4.8	4.8
Serine	4.8	5.4	5.0	5.4
Threonine	4.0	3.8	3.8	3.8
Tyrosine	3.2	2.0	3.0	1.8

- (a) Select the amino acid which

(i) is least well absorbed into the blood in both groups;

1

(ii) must be obtained from other sources as well as from food.

1

- (b) Calculate the simple, whole number ratio for tyrosine to serine in the blood of vegetarians.

1

Space for calculation

_____ : _____
tyrosine serine



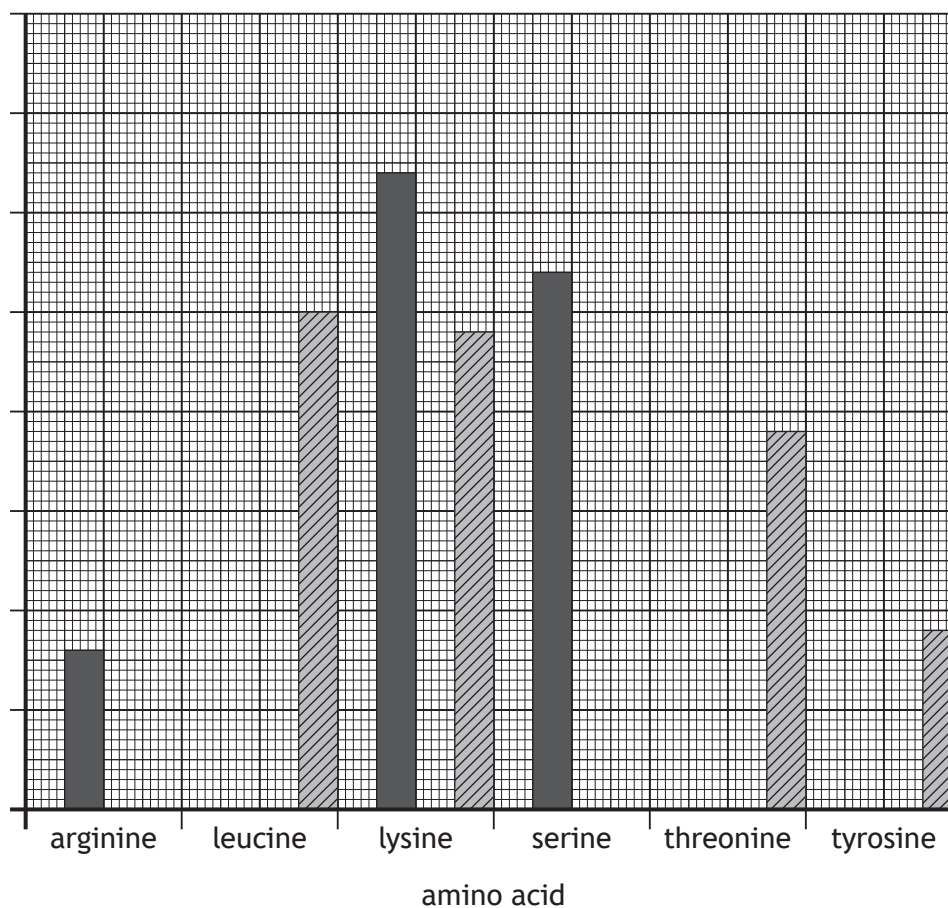
* S 8 0 7 7 5 0 1 0 8 *

4. (continued)

- (c) On the grid, complete the vertical axis by adding a label and a scale, and plot the remaining 5 bars to show the percentage of amino acids in the blood of both groups.

2

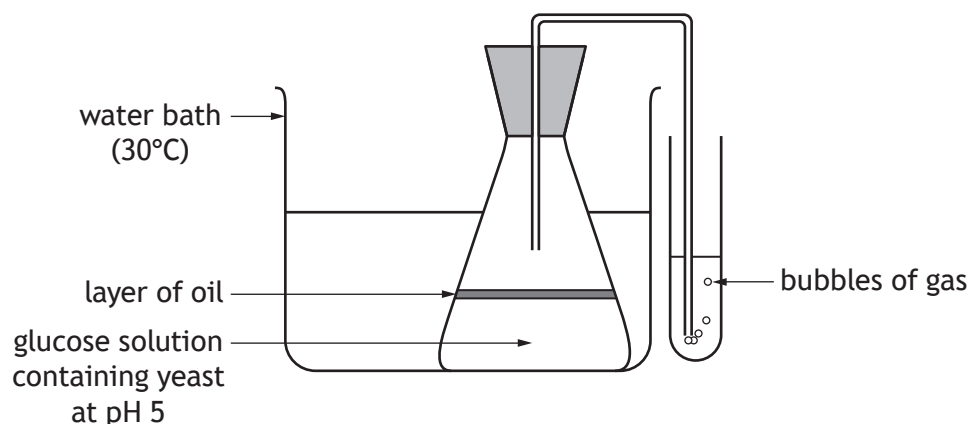
(An additional grid, if required, can be found on page 25)



Key meat eaters - amino acid in blood
 vegetarians - amino acid in blood

[Turn over

5. An investigation was carried out to find the effect of pH on fermentation by yeast, using the apparatus shown.



The investigation was repeated at pH 3, pH 7 and pH 9.

The number of bubbles produced per minute was counted.

Six groups carried out the investigation several times and calculated average values for their results, as shown in the table.

Average number of bubbles produced per minute				
Group	pH 3	pH 5	pH 7	pH 9
1	8	25	17	0
2	10	21	13	3
3	15	23	14	0
4	17	22	16	0
5	19	24	12	1
6	22	17	18	9

- (a) State **two** variables that should be controlled to make this experiment valid.

2

Variable 1 _____

Variable 2 _____

- (b) Name the gas produced during fermentation in yeast.

1



5. (continued)

- (c) From the table, identify the optimum pH for fermentation by yeast and give a reason for your choice.

2

pH _____

Reason _____

[Turn over



* S 8 0 7 7 5 0 1 1 1 *

6. Multicellular organisms require efficient communication amongst their cells, tissues and organs.

- (a) (i) Name the chemical messengers carried from one part of the human body to another in the blood.

1

- (ii) Explain why only the target tissues are affected by these chemical messengers.

2

- (b) (i) State the role of receptors in the nervous system.

1

- (ii) During a reflex action, the speed at which the information flows was measured to be 90 metres per second.

Calculate how long it would take for the information to complete a reflex arc which was 0.9 m in length.

1

Space for calculation

_____ seconds



* S 8 0 7 7 5 0 1 1 2 *

7. Progressive retinal atrophy (PRA) is a rare condition in some dogs, such as cockapoos, that can result in blindness.



PRA is caused by the inheritance of the recessive form of a particular gene, which is represented by r .

Depending on their genotype, a dog's phenotype can be described as **affected**, **unaffected** or a **carrier**.

A cockapoo breeder tested the DNA of a female dog and three male dogs before choosing which pair to breed. The results are shown in the table.

Dog	Genotype	Phenotype
Female	Rr	carrier
Male 1	Rr	carrier
Male 2	rr	
Male 3	RR	

- (a) (i) **Complete the table** by adding the phenotype for male 2 and male 3. 1
- (ii) State the term used to describe the genotype of a carrier of PRA. 1

- (iii) The breeder selected a male based on their DNA results for this condition.

The offspring were as follows:

4 unaffected and 4 carriers

Which male was chosen to breed with the female? 1

Male _____



7. (continued)

- (b) Another breeder did not carry out DNA tests before breeding a pair of cockapoos. All their offspring were affected by PRA.

Give the genotypes of the parents in this cross.

1

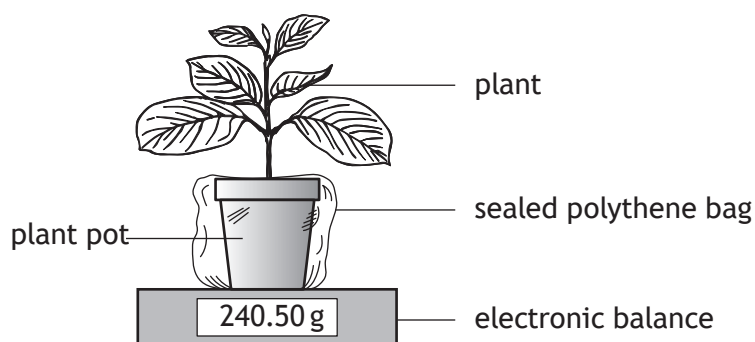
Male genotype _____ × Female genotype _____

- (c) Give the term used to describe different forms of a gene.

1



8. An experiment was set up as shown to measure the transpiration rate of a plant at room temperature. The mass was recorded at the start and again after 6 hours. The results are shown in the table.



Mass at start (g)	Mass after 6 hours (g)
240.50	232.04

It was assumed that the loss in mass was due to the evaporation of water.

- (a) Explain why it was necessary to cover the plant pot with a polythene bag. 1

- (b) Calculate the average loss in mass from this plant per hour. 1

Space for calculation

_____ g per hour

- (c) Predict the effect on the mass lost by the plant if the temperature of the room had been decreased. 1

- (d) Name the openings through which the water evaporated from the leaves of the plant. 1

[Turn over



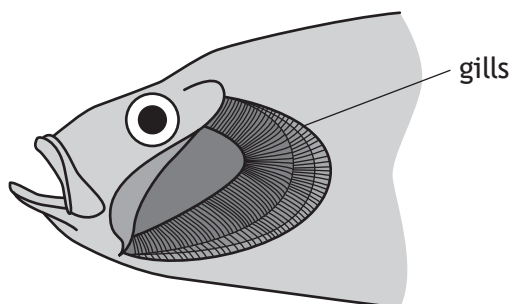
- 3

[illegible]

- 1



10. The gas exchange surfaces in fish are called gills. Gills absorb oxygen from water.



- (a) Suggest two features of gills that increase the efficiency of absorption. **2**

1 _____

2 _____

- (b) An investigation into the effect of water temperature on the breathing rate of fish was carried out. The results are shown in the table.

Water temperature (°C)	Average breathing rate (breaths/min)
4	4
10	26
14	56
20	79
26	100

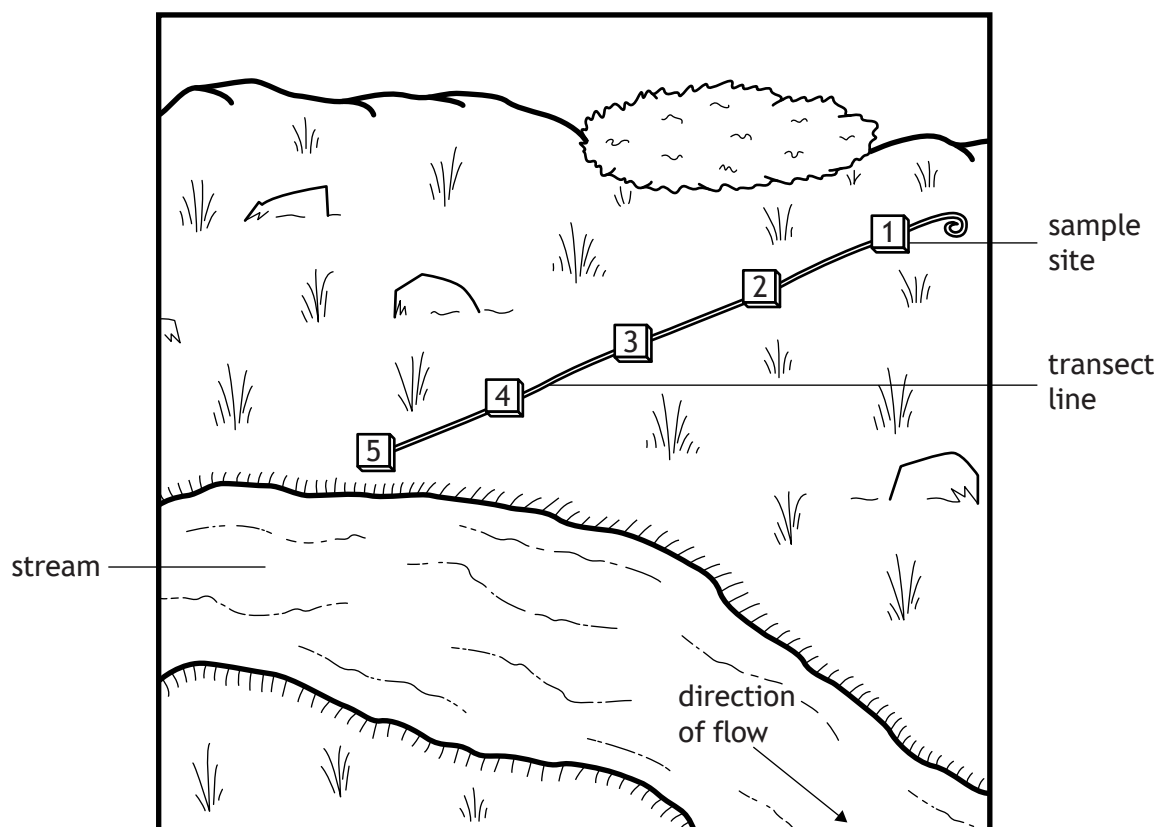
Use these results to draw a conclusion for this investigation. **1**

[Turn over

11. A group of students wanted to investigate the effect of various factors on the distribution of the plant Yellow Iris.



They set up a line transect and marked out five evenly spaced sample sites. The abundance of Yellow Iris was recorded, and values for soil temperature, pH and moisture were measured at the same sample sites.



11. (continued)

The results are shown in the table.

Sample site	Soil temperature (°C)	Soil moisture (% saturation)	Soil pH	Yellow Iris abundance
1	12	15	5.4	0
2	13	39	5.5	3
3	11	56	5.6	9
4	12	78	5.5	21
5	11	90	5.4	25

- (a) Describe the distribution of Yellow Iris along the transect line from sample site 1 to 5.

1

- (b) Identify which abiotic factor had the greatest effect on the distribution of Yellow Iris.

1

- (c) Probes were used to measure the soil moisture and soil pH.

Describe a precaution that should be taken when using a probe to make sure that the measurements are valid.

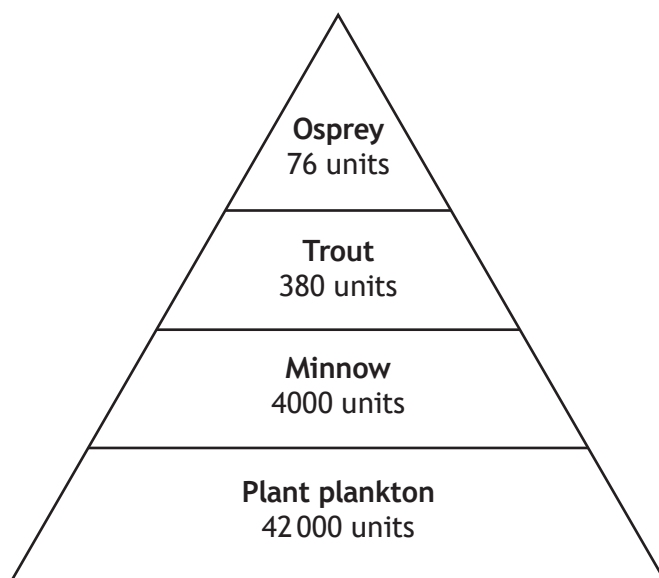
1

[Turn over



* S 8 0 7 7 5 0 1 1 9 *

12. The diagram shows the transfer of energy through a food chain in an ecosystem. The numbers represent the energy in the different populations.



- (a) Name the type of diagram shown.

1

- (b) 5% of light reaching the plant plankton is converted into new plant material.

Calculate how much energy the plant plankton received.

1

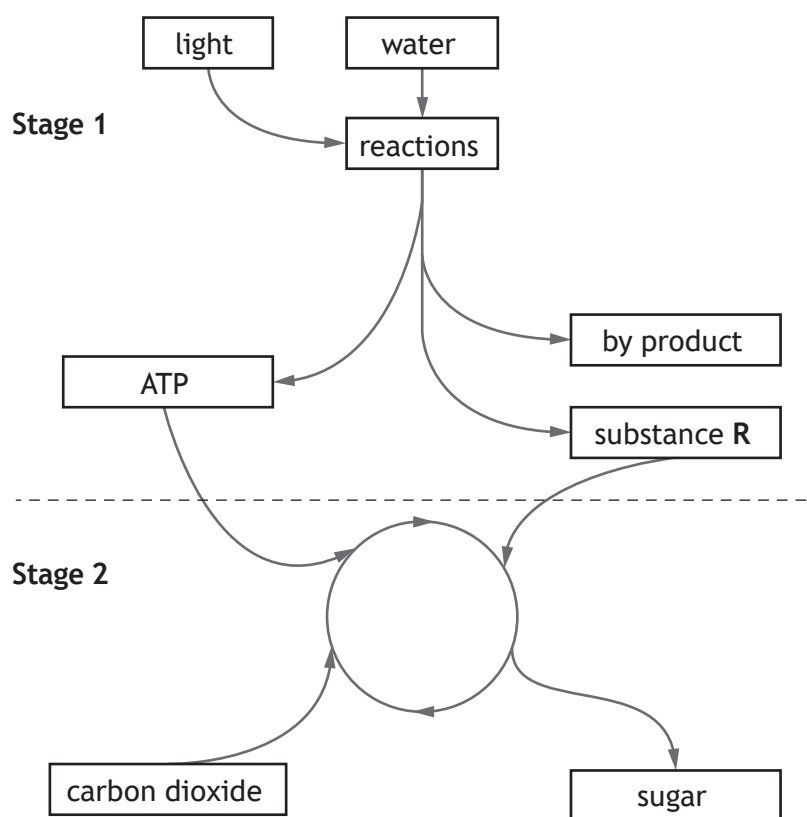
Space for calculation

_____ units

- (c) State one way in which energy can be lost from a food chain.

1

13. Photosynthesis is the process by which plants produce sugar using light. The flow diagram represents some stages of photosynthesis in a leaf.



Describe the transfer of energy in stage 1 from light arriving at the leaf, and how the sugar produced in stage 2 can be used by the plant.

3

14. The number of farmland birds in Europe has decreased dramatically in recent years. A study estimated that the total bird population has dropped from 600 million to 300 million between 1980 and 2009.

It has been suggested that the use of pesticides may have killed many of the insects that are eaten by bird species.

The effect on the populations of some bird species is shown in the table.

Bird species	Population in 1980 (millions)	Population in 2009 (millions)	Population decrease (%)
Linnet	37.0	14.0	62
Meadow pipit	34.9	12.9	63
Corn bunting	27.2	9.2	66
Starling	84.9	39.9	53
Whinchat	10.4	3.4	67
Yellow wagtail	9.4	4.4	53

- (a) Explain why the population decrease was expressed as a percentage rather than a decrease in number.

1

- (b) Using information from **the passage and the table**, calculate the percentage of Meadow pipit in the total bird population in 2009.

1

Space for calculation

_____ %

- (c) Identify the two species of birds which were least affected between 1980 and 2009.

1

_____ and _____



15. (a) Food crops are often affected by insects and disease.

The table shows the average annual losses in yield caused by insects and disease in the production of four crops in Scotland.

Crop	Average loss in yield (%)	
	Insects	Disease
Wheat	4	7
Barley	7	6
Oats	8	14
Oil seed rape	8	12

- (i) Identify the crop with the lowest combined percentage loss from these two causes.

1

- (ii) Explain why it would be incorrect to conclude that the yield for each crop plant is affected more by disease than insects.

1

- (iii) The total crop of oil seed rape harvested was 140 000 tonnes.

Calculate the yield of oil seed rape that would have been produced if insects and disease had **not** affected the plants.

1

Space for calculation

_____ tonnes

- (b) Over time pesticides can build up in the cells of living organisms.

State the term given to this build-up of pesticides.

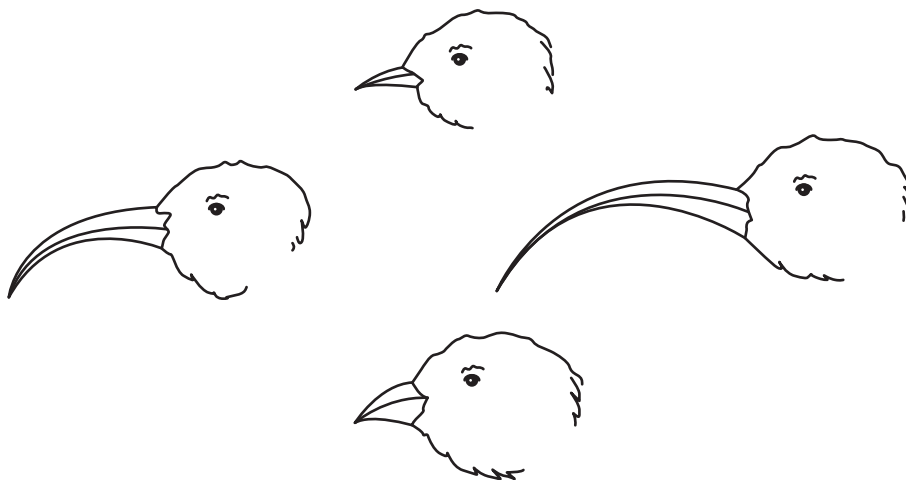
1

[Turn over



* S 8 0 7 7 5 0 1 2 3 *

16. Hawaiian honeycreepers are species of birds that have evolved from a single ancestor to have different shapes of beak. This is an example of speciation.



- (a) For speciation to occur, a population must be split by an isolation barrier.
Name one type of isolation barrier.

1

- (b) Suggest the selection pressure that could have led to the differences in the honeycreepers shown in the diagram.

1

- (c) Explain what is meant by the term species.

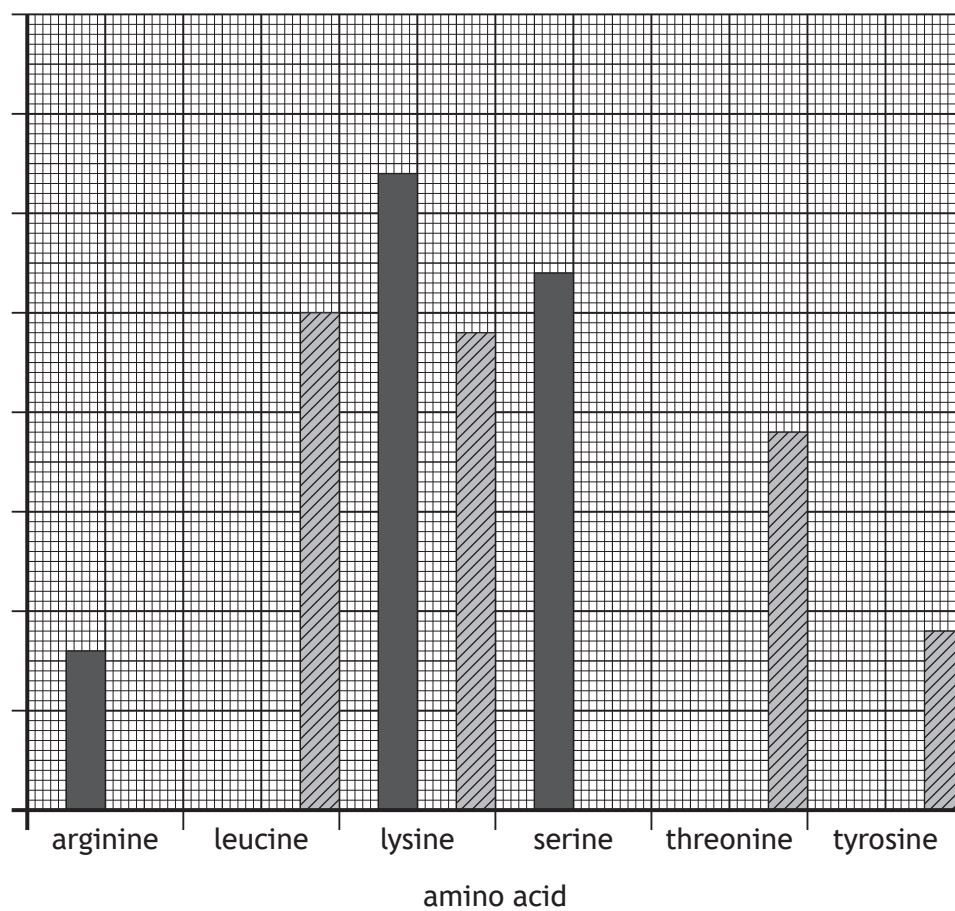
1

[END OF SPECIMEN QUESTION PAPER]



ADDITIONAL SPACE FOR ANSWERS AND ROUGH WORK

Additional grid for Question 4(c)



Key

- meat eaters - amino acid in blood
- vegetarians - amino acid in blood

ADDITIONAL SPACE FOR ANSWERS AND ROUGH WORK

DO NOT
WRITE IN
THIS
MARGIN



* S 8 0 7 7 5 0 1 2 6 *

ADDITIONAL SPACE FOR ANSWERS AND ROUGH WORK

DO NOT
WRITE IN
THIS
MARGIN

Acknowledgement of copyright

Question 11 Elena Blokhina/shutterstock.com



* S 8 0 7 7 5 0 1 2 7 *



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S807/75/01

Biology

Marking Instructions

These marking instructions have been provided to show how Qualifications Scotland would mark this specimen question paper.

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General Marking Principles for National 5 Biology

This information is provided to help you understand the general principles you must apply when marking candidate responses to questions in this paper. These principles must be read in conjunction with the detailed marking instructions, which identify the key features required in candidate responses.

- (a) Marks for each candidate response must **always** be assigned in line with these general marking principles and the detailed marking instructions for this assessment.
- (b) Marking should always be positive. This means that, for each candidate response, marks are accumulated for the demonstration of relevant skills, knowledge and understanding; they are not deducted from a maximum on the basis of errors or omissions.
- (c) If a specific candidate response does not seem to be covered by either the principles or detailed marking instructions, and you are uncertain how to assess it, you must seek guidance from your Team Leader.
- (d) There are no half marks awarded.
- (e) Where a candidate makes an error at an early stage in the first part of a question, credit should normally be given for subsequent answers that are correct with regard to this original error. Candidates should not be penalised more than once for the same error.
- (f) Unless a numerical question specifically requires evidence of working to be shown, full marks should be awarded for a correct final answer (including units, if appropriate) on its own.
- (g) In the detailed marking instructions, if a word is underlined then it is essential; if a word is (bracketed) then it is not essential.
- (h) In the detailed marking instructions, words separated by / are alternatives.
- (i) A correct answer can be negated if:
 - an extra, incorrect, response is given
 - additional information that contradicts the correct response is included.
- (j) Unless otherwise required by the question, use of abbreviations (e.g. DNA, ATP) or chemical formulae (e.g. CO₂, H₂O) are acceptable alternatives to naming.
- (k) Where incorrect spelling is given:
 - if the correct word is recognisable then give the mark;
 - if the word can easily be confused with another biological term then do not give the mark eg mitosis and meiosis;
 - if the word is a mixture of other biological words then do not give the mark, eg osmotis, respirduction, protosynthesis.
- (l) Presentation of data
 - If a candidate provides two graphs or charts, mark both and give the higher score.
 - If a question asks for a particular type of graph and the wrong type is given, then full marks cannot be awarded. Candidates cannot achieve the plot mark but **may** be able to achieve the mark for scale and label.
 - If the x and y data are transposed, then do not give the scale and label mark.
 - If the graph used less than 50% of the axes, then do not give the scale and label mark.
 - If 0 is plotted when no data is given, then do not give the plot mark (ie candidates should only plot the data given).
 - No distinction is made between bar graphs and histograms for marking purposes.

- In a pie chart lines must originate from the central point and extend to tick marks. Labels must be given in full.
- (m) Marks awarded only for a valid response to the question asked. For example, in response to questions that ask candidates to:
- **identity, name, give or state**, they need only answer or present in brief form;
 - **describe**, they must provide a statement as opposed to simply one word;
 - **explain**, they must provide a reason for the information given;
 - **compare**, they must demonstrate knowledge and understanding of the similarities and/or differences between topics being examined;
 - **calculate**, they must determine a number from given facts, figures or information;
 - **predict**, they must indicate what may happen based on available information;
 - **suggest**, they must apply their knowledge and understanding to a new situation.

Marking instructions for each question

Section 1

Question	Response	Mark
1.	D	1
2.	B	1
3.	A	1
4.	B	1
5.	A	1
6.	C	1
7.	D	1
8.	B	1
9.	A	1
10.	A	1
11.	B	1
12.	C	1
13.	A	1
14.	D	1
15.	D	1
16.	C	1
17.	A	1
18.	B	1
19.	D	1
20.	C	1

Section 2

Question			Expected response	Max mark	Additional guidance
1.	(a)		Y	1	
	(b)		Large number of mitochondria present.	1	
	(c)		Chloroplasts present. (1) Contain chlorophyll/green pigment/are green. (1)	2	
2.	(a)	(i)	From cell of alveolus wall to cell of capillary wall to red blood cell.	1	
		(ii)	(Oxygen) moves from a higher concentration to a lower Concentration. OR (Oxygen) moves down a concentration gradient.	1	
	(b)		There is no concentration gradient/ difference in concentration/ concentration equal in all cells.	1	
3.	(a)	(i)	Double (stranded) helix	1	Not acceptable: helix on its own.
		(ii)	Protein	1	Not acceptable: amino acids.
	(b)		180	1	
4.	(a)	(i)	Arginine	1	
		(ii)	Serine	1	
	(b)		1:3	1	
	(c)		Appropriate scale. (1) Bars correctly plotted with clear bar tops. (1)	2	

Question			Expected response	Max mark	Additional guidance
5.	(a)		Type of yeast Mass of yeast Concentration/volume of glucose solution Size of flask Thickness/volume of layer of oil Any 2	2	
	(b)		Carbon dioxide	1	
	(c)		pH 5 (1) Highest (average) number of bubbles (for most groups). (1)	2	Not acceptable: - reference to individual results
6.	(a)	(i)	Hormones	1	Not acceptable: named examples alone.
		(ii)	Target tissues/cells have receptors/ receptor proteins. (1) which are complementary/specific to a hormone/chemical messenger. OR Hormones are specific to the target tissue/cells. (1)	2	Must be clear that the receptors are on the target tissues.
	(b)	(i)	Detect sensory input/stimuli	1	
		(ii)	0.01	1	
7.	(a)	(i)	Affected Unaffected	1	
		(ii)	Heterozygous	1	
		(iii)	3	1	
	(b)		Male genotype rr Female genotype rr	1	
	(c)		Allele(s)	1	

Question			Expected response	Max mark	Additional guidance
8.	(a)		To prevent water evaporating/ being lost from the soil (which will affect the weight/mass).	1	
	(b)		1.41	1	
	(c)		Decrease	1	
	(d)		Stomata/stoma	1	
9.	(a)		Choose any two of arteries, veins and capillaries Comparison of: Thickness of walls Muscularity of walls Presence and absence of valves Size of channel for blood flow	3	Any three correct statements from four, comparing chosen blood vessels. Must refer to structural differences.
	(b)		Transports oxygen	1	
10.	(a)		- large surface area - thin walls - extensive blood supply or suitable description Any 2	2	Also acceptable: dense capillary network or suitable description. Not acceptable: - thin cell walls - thin on its own
	(b)		As the temperature (of the water) increases (average) breathing rate increases. OR As the temperature (of the water) decreases (average) breathing rate decreases.	1	Must show correct causation. Must refer to rate/breaths per minute and not just breath.
11.	(a)		(As you move from sample site 1 to sample site 5,) the abundance of Yellow Iris increases/it increases.	1	
	(b)		Soil moisture	1	
	(c)		Wipe/dry the probe between samples. OR Probe at the same depth each time.	1	
12.	(a)		Pyramid of energy	1	
	(b)		840 000	1	
	(c)		Heat/movement/undigested material/waste.	1	

Question			Expected response	Max mark	Additional guidance
13.			Light energy is trapped by Chlorophyll. (1) Light energy/it is converted into chemical energy in ATP. (1) (Energy stored in sugar can be used for) respiration/converted into cellulose or starch or any other correctly named substance/protein synthesis or cell division or any other named plant process. (1)	3	
14.	(a)		Initial populations all had different starting sizes.	1	
	(b)		4.3	1	
	(c)		Starling and yellow wagtail	1	
15.	(a)	(i)	Wheat	1	
		(ii)	Barley shows a greater loss to insects than disease.	1	Also acceptable: – Barley is affected more by insects than disease.
		(iii)	175 000	1	
	(b)		Bioaccumulation	1	
16.	(a)		Geographical/Ecological/Behavioural	1	Named example alone is not acceptable.
	(b)		Competition for food. OR (Type/source of) food available.	1	
	(c)		(A group of) organisms that can interbreed to produce fertile offspring.	1	Answer must imply: • there is more than one organism • breed/mate/reproduce • production of fertile offspring

[END OF SPECIMEN MARKING INSTRUCTIONS]

Published: August 2026

Change since last published:

The duration of the paper has been shortened and the number of marks reduced. Some questions have been removed from the previous specimen question paper, some have been edited or updated, and some have been replaced.