

Specimen Paper Answers – Paper 1
Cambridge IGCSE™ / IGCSE (9–1)
Biology 0610 / 0970

For examination from 2023



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Introduction

The main aim of this booklet is to exemplify standards for those teaching Cambridge IGCSE / IGCSE (9-1) Biology 0610 / 0970, and to show examples of very good answers.

In this booklet, we have provided answers for all questions with examiner comments. This paper requires candidates to answer multiple choice questions. Candidates are awarded a maximum of 40 marks for this paper and the mark scheme provides the answers required to gain the marks.

Each question and answer is followed by an examiner comment on how each answer should be determined. Additionally, the examiner has set out a number of common mistakes that occur when candidates answer the questions. In this way, it is possible to understand what candidates have done to gain their marks and how they could avoid errors.

The mark schemes for the Specimen Papers are available to download from the School Support Hub at www.cambridgeinternational.org/support

2023 Specimen Paper 1 Mark Scheme

Past exam resources and other teaching and learning resources are available on the School Support Hub www.cambridgeinternational.org/support

Assessment at a glance

The syllabus for Cambridge IGCSE Biology 0610 is available at www.cambridgeinternational.org

All candidates take three papers. Candidates who have studied the Core syllabus content, or who are expected to achieve a grade D or below, should be entered for Paper 1, Paper 3 and either Paper 5 or Paper 6. These candidates will be eligible for grades C to G.

Candidates who have studied the Extended syllabus content (Core and Supplement), and who are expected to achieve a grade C or above, should be entered for Paper 2, Paper 4 and either Paper 5 or Paper 6. These candidates will be eligible for grades A* to G.

Core assessment

Core candidates take Paper 1 and Paper 3. The questions are based on the Core subject content only:

Paper 1: Multiple Choice (Core)	
45 minutes	
40 marks	30%
40 four-option multiple-choice questions	
Externally assessed	

Paper 3: Theory (Core)	
1 hour 15 minutes	
80 marks	50%
Short-answer and structured questions	
Externally assessed	

Extended assessment

Extended candidates take Paper 2 and Paper 4. The questions are based on the Core and Supplement subject content:

Paper 2: Multiple Choice (Extended)	
45 minutes	
40 marks	30%
40 four-option multiple-choice questions	
Externally assessed	

Paper 4: Theory (Extended)	
1 hour 15 minutes	
80 marks	50%
Short-answer and structured questions	
Externally assessed	

Practical assessment

All candidates take one practical paper from a choice of two:

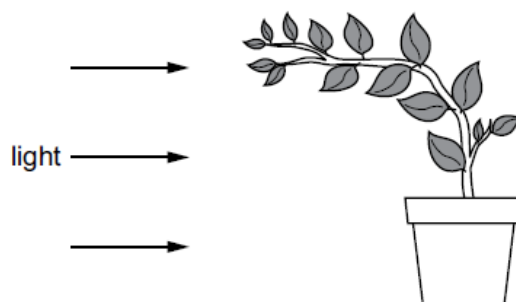
Paper 5: Practical Test	
1 hour 15 minutes	
40 marks	20%
Questions will be based on the experimental skills in Section 4	
Externally assessed	

Paper 6: Alternative to Practical	
1 hour	
40 marks	20%
Questions will be based on the experimental skills in Section 4	
Externally assessed	

Specimen answers

Question 1

1 The diagram shows a plant.



Which characteristic of living organisms is shown by the plant in the diagram?

- A excretion
- B reproduction
- C respiration
- D sensitivity

Candidate answer: D

Mark awarded = 1

Examiner comment

The candidate needs to recognise that the plant is growing towards the light, and that this represents the ability to respond to a stimulus.

Question 2

2 Humans have the scientific name *Homo sapiens*.

What do the two parts of this name refer to?

- A genus and species
- B group and genus
- C kingdom and genus
- D kingdom and species

Candidate answer: A

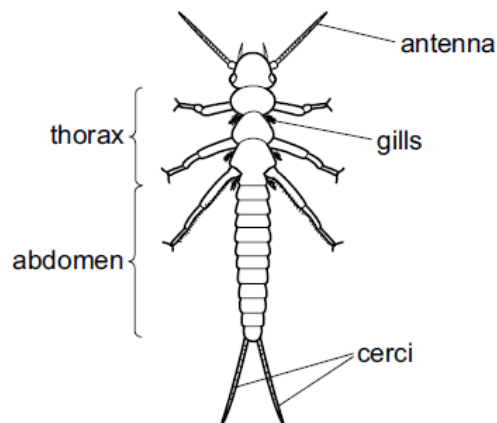
Mark awarded = 1

Examiner comment

This question tests recall of the binomial system of naming organisms.

Question 3

3 The diagram shows a stonefly larva.



Use the key to identify the stonefly larva.

- 1 has two cerci at the end of the abdomen..... go to 2
 has three cerci at the end of the abdomen go to 3
- 2 abdomen longer than thorax..... **A**
 thorax longer than abdomen..... **B**
- 3 gills visible on the thorax **C**
 gills not visible **D**

Candidate answer: A

Mark awarded = 1

Examiner comment

The answer is obtained by selecting the first description in 1, and the first description in 2.

Common mistakes

Candidates who do not work systematically through the key may see the description 'gills visible on thorax' and give the incorrect answer C.

Question 4

- 4 Which part of a plant cell controls the movement of substances into and out of the cell?
- A** cell membrane
B cell wall
C cytoplasm
D vacuole

Candidate answer: A

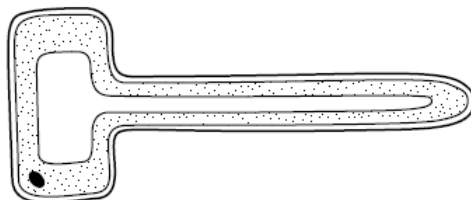
Mark awarded = 1

Examiner comment

This question tests recall of the functions of parts of a cell.

Question 5

- 5 The diagram shows the structure of a plant cell.



What is a function of this specialised plant cell?

- A It absorbs carbon dioxide from the air.
- B It absorbs ions from the soil.
- C It transports sucrose from leaves.
- D It transports water in stems.

Candidate answer: B

Mark awarded = 1

Examiner comment

To answer this question, candidates need to recognise that the diagram shows a root hair cell and then recall the functions of root hair cells.

Question 6

- 6 The photograph shows a chloroplast magnified $\times 7000$.



What is the actual size of the chloroplast?

- A 0.0001 mm
- B 0.001 mm
- C 0.01 mm
- D 100 mm

Candidate answer: C

Mark awarded = 1

Examiner comment

This question tests the ability to recall and use the magnification equation and to calculate the size of specimens using millimetres as units. The use of a calculator is permitted in all Biology papers and would be very helpful here.

$$\begin{aligned} \text{magnification} &= \text{image size} \div \text{actual size} \\ &= 70 \text{ mm} \div 7000 \\ &= 0.01 \text{ mm} \end{aligned}$$

Question 7

- 7 How do carbon dioxide and oxygen move into and out of a mesophyll cell?
- A active transport
 - B diffusion
 - C osmosis
 - D transpiration

Candidate answer: B

Mark awarded = 1

Examiner comment

This is a recall question, requiring knowledge both of diffusion and the role of mesophyll cells in photosynthesis.

Question 8

- 8 What are the features of active transport?

	occurs through a cell membrane	particles move from a higher concentration to a lower concentration	uses energy from respiration
A	✓	✓	✓
B	✓	✓	✗
C	✓	✗	✓
D	✗	✓	✓

key:
✓ = yes
✗ = no

Candidate answer: C

Mark awarded = 1

Examiner comment

This question requires simple recall of the description of active transport.

Question 9

- 9 The data shows the concentrations of sugar and starch in an onion.

total sugar including reducing sugar /g per 100g	starch /g per 100g
3.7	0.0

The onion is tested with Benedict's solution and iodine solution.

Which set of results is correct?

	Benedict's solution	iodine solution
A	blue	blue-black
B	blue	brown
C	brick red	blue-black
D	brick red	brown

Candidate answer: D

Mark awarded = 1

Examiner comment

Candidates should first think about the reagents used to test for reducing sugar and starch, then recall the colours that they give with a negative and positive result, and finally apply this thinking to the information provided in the table.

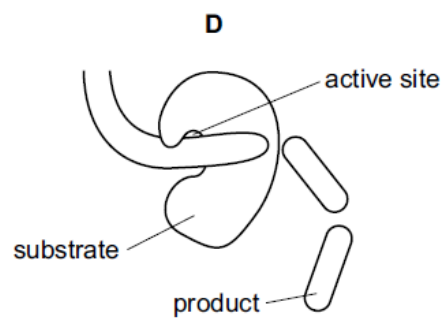
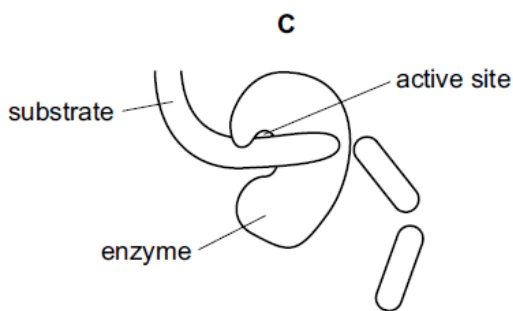
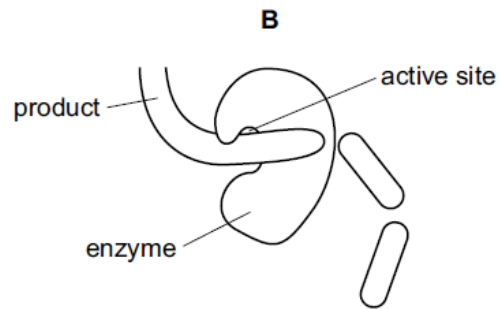
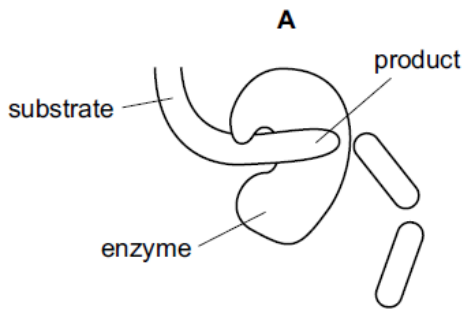
Common mistakes

Candidates may confuse the colours given in the different food tests.

Question 10

- 10 The diagrams show a protease enzyme catalysing the breaking of part of a protein molecule into smaller pieces.

Which diagram has three correct labels?



Candidate answer: C

Mark awarded = 1

Examiner comment

This question requires understanding of the terms substrate, product, enzyme and active site. Once these terms have been recalled, the candidate needs to work carefully through each of the four diagrams.

Common mistakes

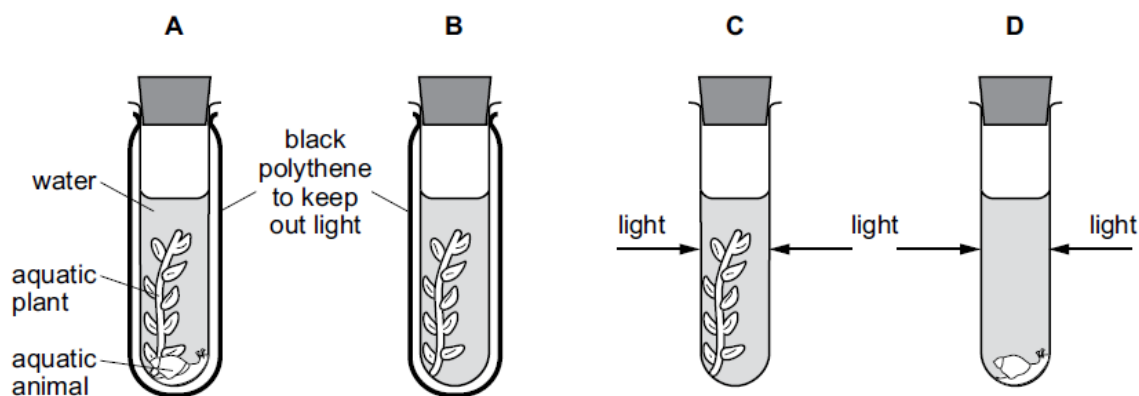
Working too quickly can produce an incorrect answer. For example, a candidate may see the correctly labelled 'active site' and 'enzyme' on diagram B and not take the time to look at options C or D.

Question 11

11 The apparatus shown was used in an experiment.

The carbon dioxide content of the water in each test-tube was measured at the start of the experiment and again three hours later.

In which test-tube will the carbon dioxide concentration decrease?



Candidate answer: C

Mark awarded = 1

Examiner comment

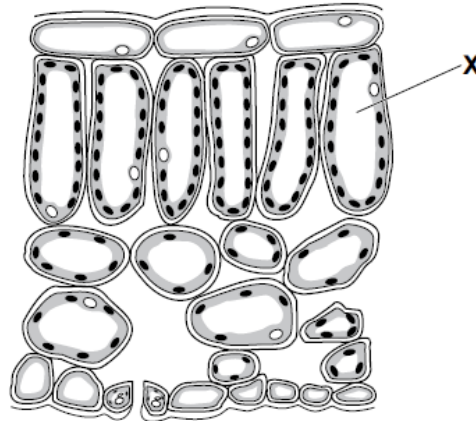
There is quite a lot of information to be carefully read and understood, both in words and in the labelled diagrams. The candidate then needs to recall that photosynthesis uses carbon dioxide, that respiration produces it, and that photosynthesis can occur only in the light.

Common mistakes

Failing to consider all the information provided or confusing the processes of photosynthesis and respiration, can lead to an incorrect response. For example, a candidate who fails to notice the black polythene around tube B could incorrectly give B as their answer.

Question 12

12 The diagram shows a cross-section of part of a leaf.



What is the name of the cell labelled X?

- A epidermal cell
- B guard cell
- C palisade mesophyll cell
- D spongy mesophyll cell

Candidate answer: C

Mark awarded = 1

Examiner comment

This question requires recall of the structure of a leaf.

Question 13

13 Why do plants need nitrate ions?

- A Nitrogen is a component of amino acids.
- B Nitrogen is a component of fatty acids.
- C Nitrogen is a component of glucose.
- D Nitrogen is a component of starch.

Candidate answer: A

Mark awarded = 1

Examiner comment

This is also a recall question.

Question 14

14 In which part of the body of a mammal does physical digestion occur?

- A gall bladder
- B liver
- C mouth
- D pancreas

Candidate answer: C

Mark awarded = 1

Examiner comment

Candidates need to think about what physical digestion is. They then need to consider what happens in each of the listed parts of the digestive system and recognise that digestion of any kind occurs only in the mouth. This is also the only one of the four organs through which food passes.

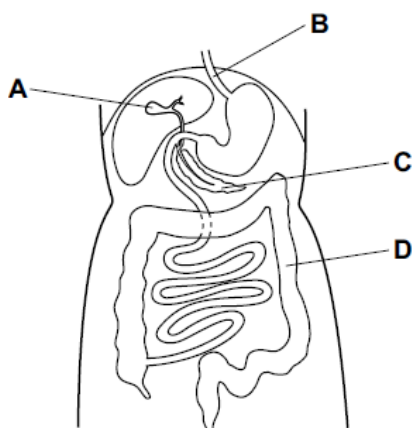
Common mistakes

Candidates may incorrectly suggest A if they remember that the gall bladder produces bile, that bile emulsifies fats, and that this is physical digestion. However, digestion does not happen in the gall bladder as food does not pass through it.

Question 15

15 The diagram shows part of the human digestive system.

Which structure produces lipase?



Candidate answer: C

Mark awarded = 1

Examiner comment

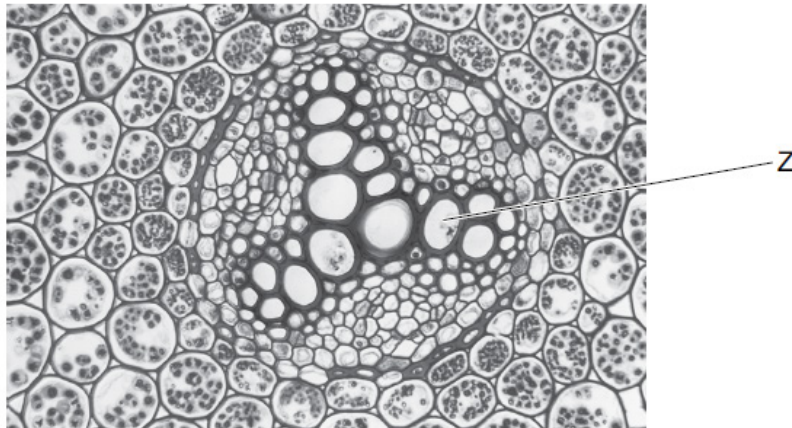
This is a recall question.

Common mistakes

Lipase is often the least well-known enzyme, so some candidates may not be able to recall where it is produced.

Question 16

16 The photomicrograph shows a cross-section through the root of a buttercup plant.



What is the main function of the tissue labelled Z?

- A photosynthesis
- B respiration
- C transport of sugars
- D transport of water

Candidate answer: D

Mark awarded = 1

Examiner comment

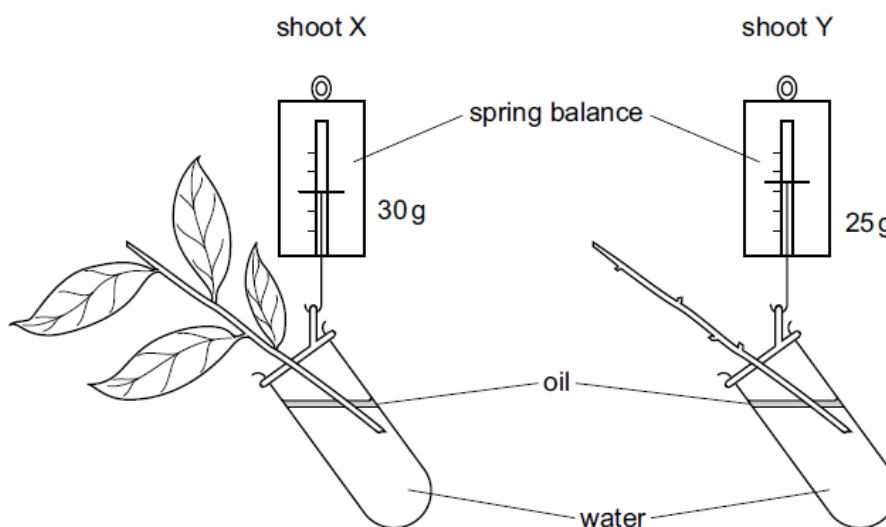
Interpretation of photomicrographs can be difficult, but this one is very clear and candidates may have seen a similar one during their course. They need first to recognise that Z is a xylem vessel and then recall its function.

Common mistakes

Candidates could wrongly identify Z as phloem, in which case they might give answer C. Alternatively, they might correctly identify Z as xylem, but confuse the functions of xylem and phloem, again wrongly arriving at answer C.

Question 17

17 The diagram shows two shoots at the start of an experiment on transpiration.



What are the likely readings on the spring balances after three days?

	shoot X/g	shoot Y/g
A	25	30
B	25	25
C	30	25
D	30	30

Candidate answer: B

Mark awarded = 1

Examiner comment

Candidates need to take time to absorb the information in the diagrams. The best approach would be to read the question and think about what will happen to each shoot, which should lead the candidate to the realisation that shoot X will lose more water by transpiration than shoot Y. They then need to look at the initial masses of each shoot and find the row in the table that gives a mass lower than 30g for X and a mass that is the same as, or only a very small amount lower than, 25g for shoot Y.

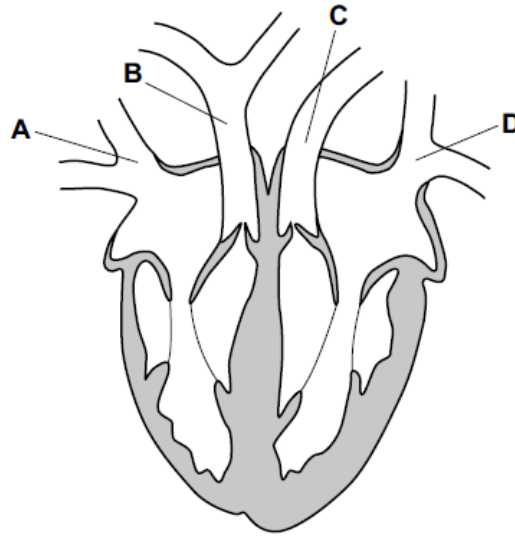
Common mistakes

Mistakes are most likely to be made if candidates feel rushed and do not take time to think carefully through each step and bring all the information together. For example, if they appreciate that shoot X will lose more mass than shoot Y, but do not look at the diagram to see what the initial masses were, they could choose option A as their incorrect answer.

Question 18

18 The diagram shows a section through a human heart.

Which blood vessel is the pulmonary vein?



Candidate answer: D

Mark awarded = 1

Examiner comment

This is a recall question.

Question 19

19 Which part of the blood contains haemoglobin?

- A plasma
- B platelets
- C red blood cells
- D white blood cells

Candidate answer: C

Mark awarded = 1

Examiner comment

This requires simple recall.

Question 20

20 What are the approximate percentages of oxygen and carbon dioxide in inspired air?

	percentage of oxygen	percentage of carbon dioxide
A	16	4.00
B	16	8.00
C	20	0.04
D	20	4.00

Candidate answer: C

Mark awarded = 1

Examiner comment

This question requires candidates to recall the values for concentrations of different gases in inspired air.

Common mistakes

There is a possibility that a candidate might confuse inspired air with expired air, which would result in giving answer A.

Question 21

21 Which environmental conditions must always be present for seed germination?

- A carbon dioxide and water
- B light and suitable temperature
- C oxygen and carbon dioxide
- D water and oxygen

Candidate answer: D

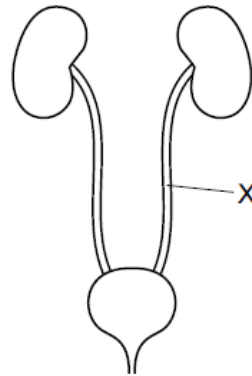
Mark awarded = 1

Examiner comment

This is a recall question. Candidates should have investigated the conditions required for germination of seeds and know that water, oxygen and a suitable temperature are always required.

Question 22

22 The diagram shows part of the excretory system.



What is structure X?

- A bladder
- B kidney
- C ureter
- D urethra

Candidate answer: C

Mark awarded = 1

Examiner comment

This is a straightforward recall question using a diagram that should be familiar to most candidates.

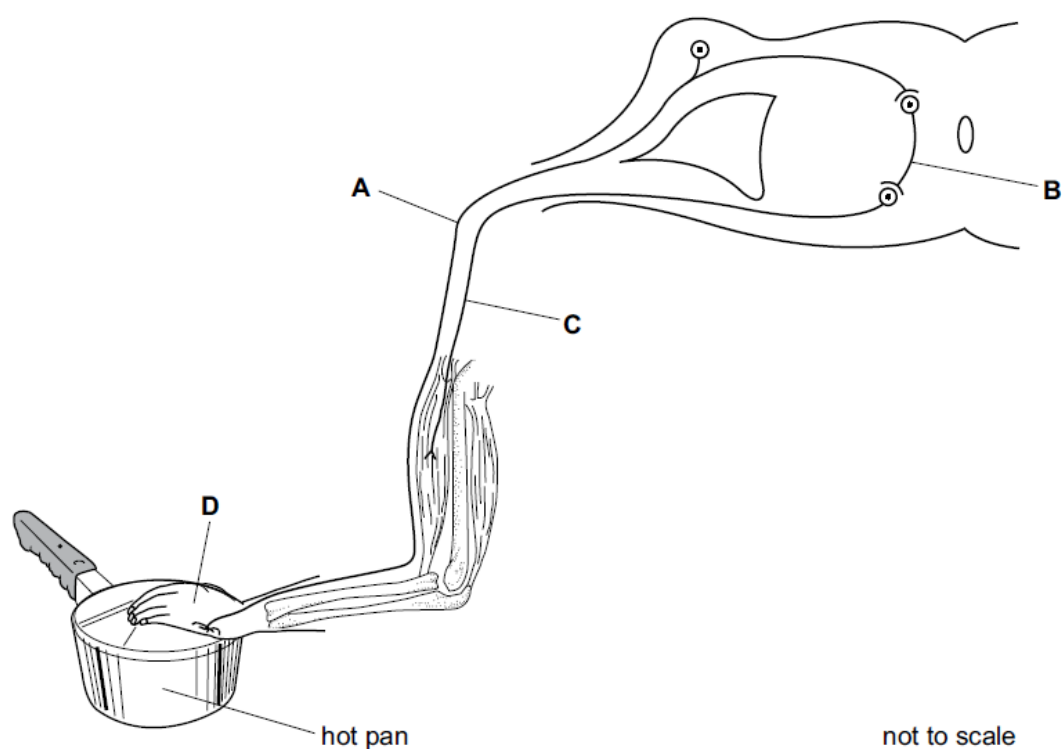
Common mistakes

This is one of the instances where recall of correct spelling is essential, as a lack of this can lead to confusion between ureter and urethra.

Question 23

23 The diagram shows a reflex arc.

Which structure is the sensory neurone?



Candidate answer: A

Mark awarded = 1

Examiner comment

This diagram, or one that is fairly similar to it, should be familiar to most candidates. They need to recall what a sensory neurone looks like, and its position in a reflex arc, and then apply this knowledge to the diagram.

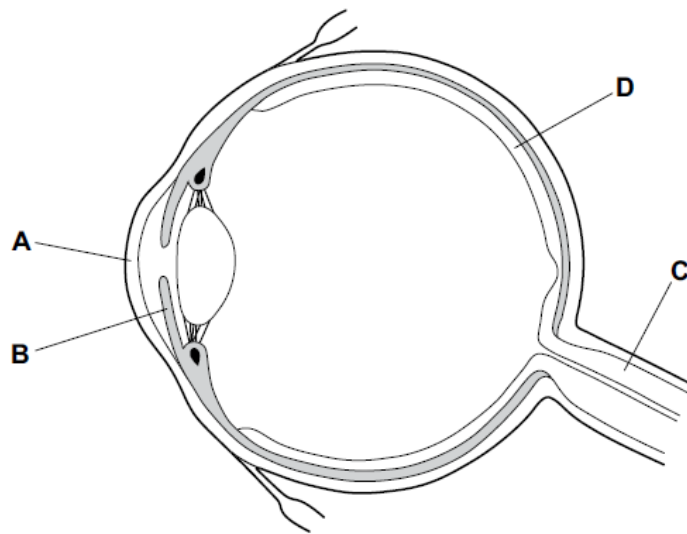
Common mistakes

Candidates sometimes confuse the sense organ, which would be in the part labelled D, with a sensory neurone.

Question 24

24 The diagram shows the structure of the eye.

Which structure refracts light?



Candidate answer: A

Mark awarded = 1

Examiner comment

To answer this question, candidates need to consider first the structure of the eye, and then the functions of the different parts.

Common mistakes

The question depends on understanding of the word 'refracts' and if that is not known then B or D could be given as incorrect responses.

Question 25

25 Which disease can be caused by a lack of vitamin C?

- A AIDS
- B coronary heart disease
- C rickets
- D scurvy

Candidate answer: D

Mark awarded = 1

Examiner comment

This is a straightforward recall question.

Question 26

26 What is formed when the nucleus of a sperm fuses with the nucleus of an egg?

- A gamete
- B ovule
- C stamen
- D zygote

Candidate answer: D

Mark awarded = 1

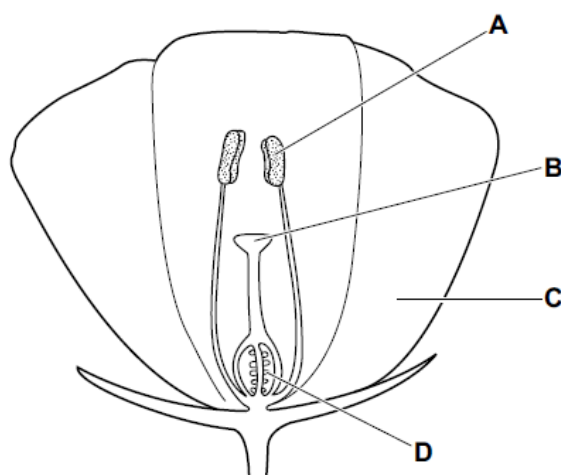
Examiner comment

This question tests recall of the description of sexual reproduction.

Question 27

27 The diagram shows part of a flower.

Where does fertilisation occur?



Candidate answer: D

Mark awarded = 1

Examiner comment

This question requires recall of the process of fertilisation in a flower.

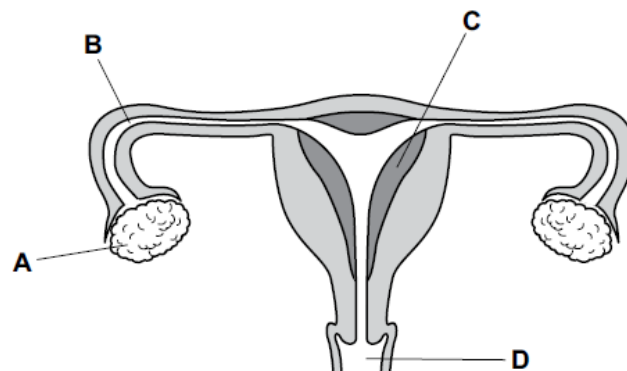
Common mistakes

Candidates may confuse fertilisation with pollination, which would lead to either A or B being given as an incorrect response.

Question 28

28 The diagram shows the female reproductive system.

Where does implantation normally occur?



Candidate answer: C

Mark awarded = 1

Examiner comment

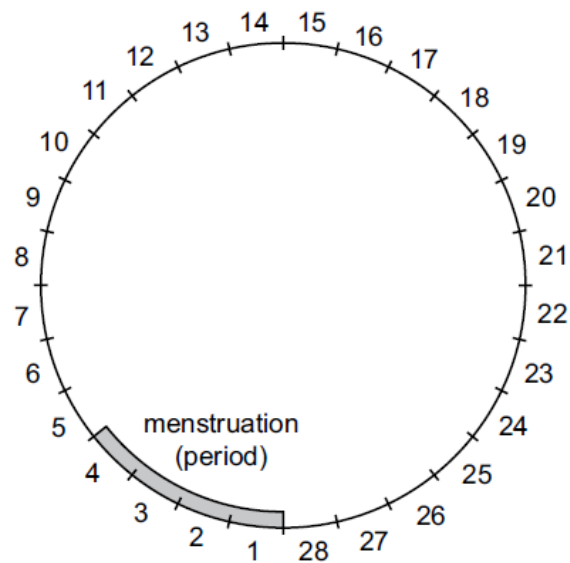
Candidates need to know the meaning of the term implantation and then recall and recognise the part of the system in which this occurs.

Common mistakes

Option B may be given as an incorrect answer if the meaning of implantation is not known.

Question 29

29 The diagram shows a timeline of a woman's menstrual cycle, which lasts for 28 days.



On which days of the menstrual cycle is a woman most likely to ovulate?

- A days 1–4
- B days 7–10
- C days 13–16
- D days 20–23

Candidate answer: C

Mark awarded = 1

Examiner comment

This is likely to be a recall question for most candidates.

Question 30

30 The human immunodeficiency virus (HIV) can be transmitted in body fluid.

Some examples of body fluids are listed.

- 1 blood
- 2 saliva
- 3 semen
- 4 tear fluid

Which body fluids can transmit HIV?

- A** 1, 2, 3 and 4
B 1, 2, and 3 only
C 1 and 3 only
D 3 only

Candidate answer: C

Mark awarded = 1

Examiner comment

This is a recall question.

Common mistakes

This type of question can be tricky for some candidates as they not only have to select the correct fluids, but then match their choices to the four possible answers.

Question 31

31 The information shows what happens during some of the stages of sexual reproduction in a human.

egg + sperm → fertilised egg → male embryo

Which sex chromosomes are present in the egg, sperm and fertilised egg shown?

	egg	sperm	fertilised egg
A	X	X	XX
B	X	Y	XY
C	Y	X	XY
D	Y	Y	YY

Candidate answer: B

Mark awarded = 1

Examiner comment

This question requires careful reading of the information to note that a male embryo is eventually produced. The candidate then needs to recall that a male has chromosomes XY, and that all eggs contain an X chromosome while sperm can contain either X or Y.

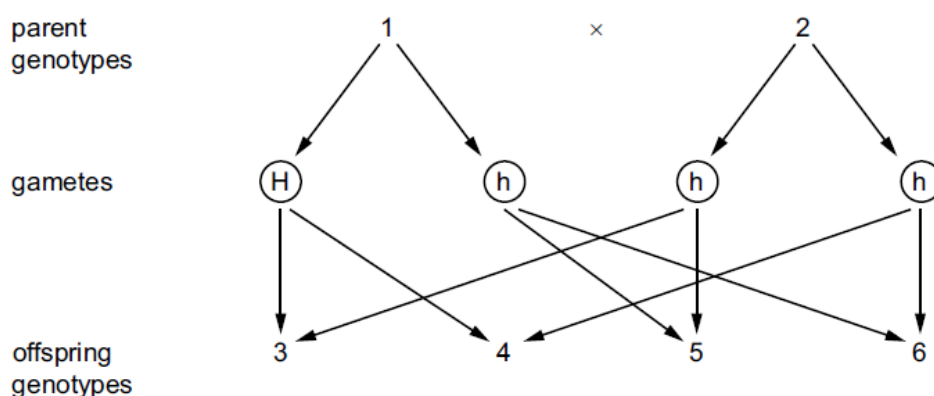
Common mistakes

Missing out on any of the information provided, or incorrect recall of the sex chromosomes in eggs and sperm, could lead to any of the three possible incorrect responses being selected.

Question 32

32 The genetic diagram shows a monohybrid cross.

H is the dominant allele and h is the recessive allele.



Which of the parents and offspring are heterozygous?

- A 1, 3 and 4
- B 1, 5 and 6
- C 2, 3 and 4
- D 2, 5 and 6

Candidate answer: A

Mark awarded = 1

Examiner comment

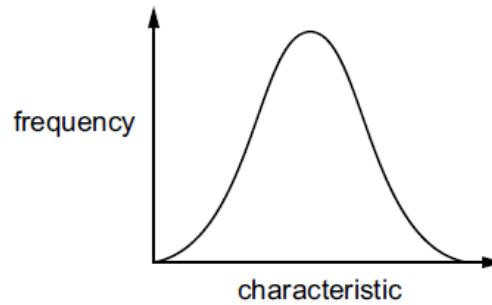
Candidates need to remember the meaning of the term heterozygous. They then need to use the information in the 'gametes' line to determine that parent 1 but not 2 is heterozygous, and that offspring 3 and 4 are also heterozygous.

Common mistakes

If the term heterozygous is not known, then candidates will be unable to work out the correct answer. A less likely mistake is misinterpreting the genetic diagram so that they do not correctly assign alleles to the four offspring genotypes.

Question 33

33 The graph shows the distribution of a characteristic in a population.



Which characteristic is shown by the curve?

- A ABO blood groups in humans
- B body length in humans
- C seed colour in peas
- D seed shape in peas

Candidate answer: B

Mark awarded = 1

Examiner comment

The graph shows a normal distribution of a continuously varying characteristic. The only such characteristic in the list is option B.

Common mistakes

Candidates may have difficulty in remembering the differences between continuous and discontinuous variation. They may also not recall that seed colour and seed shape in peas show discontinuous variation.

Question 34

34 Dates are a type of fruit.

The table shows some features of the dates a farmer grows.

variety	colour	texture	yield	size
Barhee	amber	soft	high	small to medium
Dayri	dark reddish brown	semi dry	variable	medium to large
Hayany	purplish black	soft	medium	large
Maktoom	amber	soft	medium	medium to large
Thoory	straw coloured	dry	medium	medium to large

The farmer would like to produce a new variety of date using selective breeding.

He wants a medium-sized date that is straw coloured and soft, with a high yield.

Which two varieties could the farmer breed together to get the variety he wants?

- A Barhee and Dayri
- B Barhee and Thoory
- C Dayri and Maktoom
- D Maktoom and Thoory

Candidate answer: B

Mark awarded = 1

Examiner comment

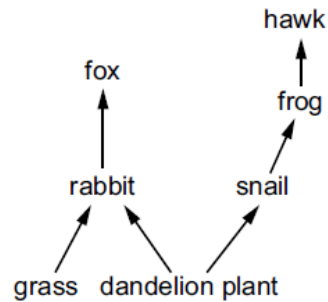
This question requires much careful thought, and will take more time to work through than simpler recall questions. A good plan would be to circle the three characteristics required (straw coloured, soft, high yield) wherever they occur in the table. It is then possible to select the only two varieties that, between them, provide all three characteristics.

Common mistakes

It can be difficult to slow down and take the time to absorb all the information in a question like this which can lead to rushed and incorrect responses. A useful tactic when arriving at such a question is to move on to less time-consuming ones and return to this one when all the others have been answered and the candidate knows how much time they have left.

Question 35

35 The diagram shows a woodland food web.



Which statement is correct?

- A The rabbit and the frog are both herbivores.
- B The fox and the hawk are both secondary consumers.
- C The frog is a tertiary consumer.
- D The rabbit and the snail are both primary consumers.

Candidate answer: D

Mark awarded = 1

Examiner comment

Candidates need first to look at the food web and then read each statement carefully. They will arrive at the correct response if they understand the meaning of the terms used (herbivore, secondary consumer, tertiary consumer and primary consumer) and apply this carefully to the diagram.

Common mistakes

This is another question where some candidates may be too impatient to look carefully and take the time to think about each option, checking whether the statement matches what is shown in the food web.

Question 36

36 The table shows processes in the carbon cycle that release carbon dioxide into the air, or remove carbon dioxide from the air.

Which row is correct?

	releases carbon dioxide into the air	removes carbon dioxide from the air
A	decay	photosynthesis
B	combustion	respiration
C	photosynthesis	combustion
D	respiration	decay

Candidate answer: A

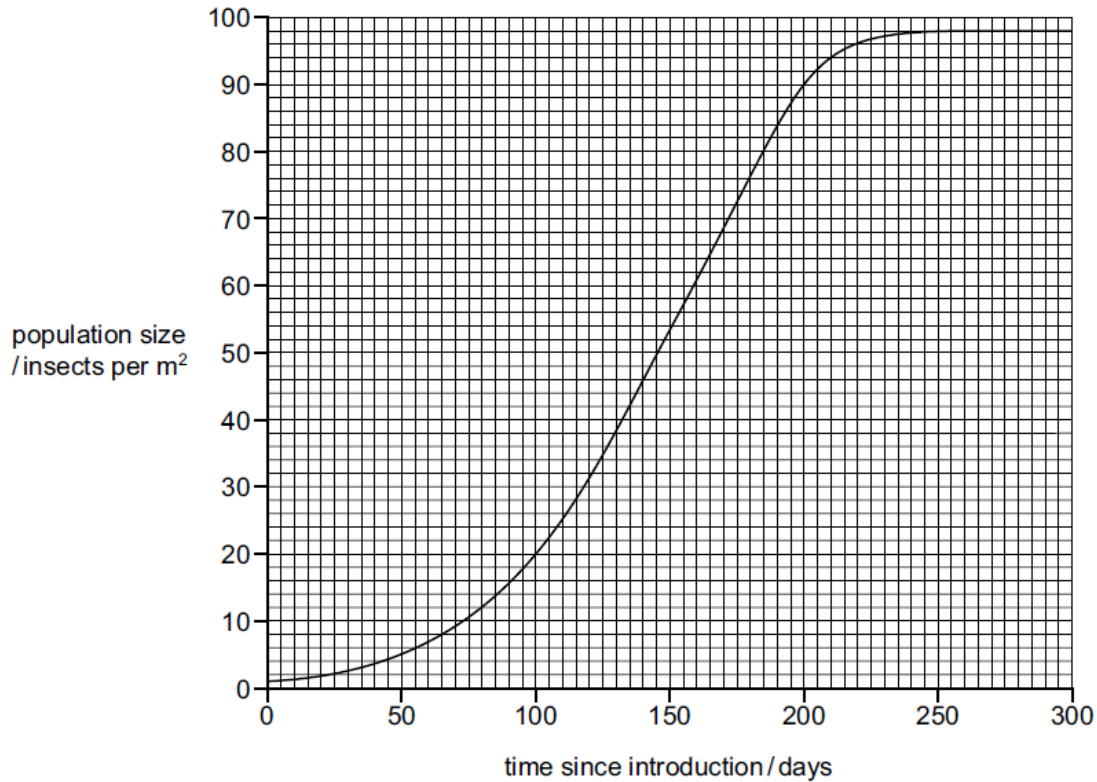
Mark awarded = 1

Examiner comment

This question tests recall of the carbon cycle.

Question 37

37 The graph shows a population growth curve for a species of insect which has been introduced to an island.



How long after the introduction does the insect population start to be limited by resources such as food?

- A 50 days B 100 days C 150 days D 200 days

Candidate answer: D

Mark awarded = 1

Examiner comment

Candidates are required to have an understanding of the term 'limited' and be able to apply this to the shape of the graph.

Question 38

38 What is a negative impact of large-scale monocultures?

- A Crops need harvesting at the same time.
- B Monocultures produce different types of food.
- C Monocultures produce more food.
- D The genetic variation of organisms is reduced.

Candidate answer: D

Mark awarded = 1

Examiner comment

Candidates are required to know the meaning of the terms 'negative impact' and 'large-scale monoculture' and then apply their knowledge to select the only correct option from the list.

Common mistakes

Candidates who do not recognise the meaning of 'negative impact' may give any of the three incorrect options, because these are linked to monocultures.

Question 39

39 What could help to prevent a species from becoming endangered?

- A a captive breeding programme
- B deforestation
- C introduction of other species
- D pollution

Candidate answer: A

Mark awarded = 1

Examiner comment

This is a recall question.

Question 40

40 What is an example of genetic modification?

- A inserting genes into bacteria
- B inserting insulin into bacteria
- C spraying plants with herbicides
- D using biological washing powders

Candidate answer: A

Mark awarded = 1

Examiner comment

All the processes outlined in the four options should be familiar to candidates, so their task is to recall what is meant by genetic modification and then apply this to the list.

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