

Practice Exams for AS OCR Biology A

Paper 2

Update v1.1, May 2024

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Teacher's Introduction

This pack contains **four practice Paper 2s** for the OCR AS Biology A syllabus.

The AS consists of two papers, both of 1 hour 30 minutes duration and both worth 70 marks.

Paper 1 is entitled **Breadth in Biology** and has 20 multiple-choice questions along with short-answer questions.

Paper 2 covers **Depth in Biology** and comprises short- and long-answer questions. Students will also be tested on their quality of written communication (QWC) in Paper 2.

A specification grid and mark schemes have been provided with the papers and this resource has been designed to reflect the new syllabus and sample assessment materials as closely as possible. Each topic has been covered, more than once where possible, and all new entries to the syllabus are included within the pack. With the government's focus on improving mathematical and practical skills, I hope that you and your students find the content of these papers both challenging and helpful.

Write-on and **non-write-on** versions are included in this pack. For **non-write-on** versions, inserts are provided at the end of each paper for questions that require the student to annotate a diagram; for example, annotating a graph.

Enjoy!

April 2016

Update v1.1, May 2024:

Changes have been made to reflect the 2023 accessibility and clarity amendments to the specification:

Paper 2C, Question 2 d) on pages 29 and 64 – vacuolar pathway removed

Paper 2D Question 4 e) ii) on pages 44, 73 and 92 – chi-squared formula and notation update

The following QWC (quality of written communication) mark schemes have been amended so that they are exam-style:

Paper 2A, Question 3 f) on pages 12, 52 and 79 (question has also increased from 5 to 6 marks)

Paper 2A, Question 4 c) on page 80

Paper 2B, Question 3 d) on pages 82 and 83

Paper 2B, Question 4 on page 83

Paper 2C, Question 3 d) on page 87

Paper 2C, Question 4 e) on pages 34, 67 and 88 (question has also increased from 5 to 6 marks)

Paper 2D, Question 3 a) on pages 41, 72, 90 and 91 (question has also increased from 5 to 6 marks)

Paper 2D, Question 5 on pages 45, 73 and 92 (question has also increased from 5 to 6 marks)

The following questions have been amended to remove 1 mark (following changes to the QWC questions) to keep the total paper at 70 marks:

Paper 2A, Question 1 e) on pages 7, 49 and 77

Paper 2C, Question 2 b) ii) on pages 28, 64, 85 and 86

Paper 2D, Question 1 e) i) on pages 38, 70 and 89

Paper 2D, Question 2 b) on pages 39, 71, 89 and 90

Free Updates!

Register your email address to receive any future free updates* made to this resource or other Biology resources your school has purchased, and details of any promotions for your subject.

* resulting from minor specification changes, suggestions from teachers and peer reviews, or occasional errors reported by customers

Go to [zzed.uk/freeupdates](https://www.zzed.uk/freeupdates)

Specification Cross-referencing Table

Section A (MCQs) (not underlined) Section B (underlined)

| Practice Exam Papers for AS OCR Biology A | | | | | | | | |
|---|---------------------------------|-------------------------|----------------------|----------------------|-----------------|-----------------|-----------------|-----------------|
| | Paper 1s (available separately) | | | | Paper 2s | | | |
| | Paper 1A | Paper 1B | Paper 1C | Paper 1D | Paper 2A | Paper 2B | Paper 2C | Paper 2D |
| 1 Development of Practical Skills in Biology | | | | | | | | |
| 1.1.1 Planning | <u>23</u> | <u>22</u> | <u>22, 23</u> | <u>22</u> | 1 | 2 | 2, 3 | 4 |
| 1.1.2 Implementing | 4, <u>23</u> | 1, 8, <u>22</u> | 7, <u>23</u> | <u>21, 22</u> | 1, 2 | 3 | 2 | 1, 2, 4 |
| 1.1.3 Analysis | <u>21, 23</u> | 5, 16, 20 | <u>22, 23</u> | 9, <u>21, 22, 24</u> | 1, 2 | 2 | 4 | 4 |
| 1.1.4 Evaluation | 5, <u>21, 23</u> | 7, 17, <u>22, 23</u> | <u>22</u> | <u>21, 22</u> | 2 | 2 | 3 | |
| 2 Foundations in Biology | | | | | | | | |
| 2.1.1 Cell Structure | 1, 3, 4, 7, 17 | 1, 3, 10, 15, <u>21</u> | 2 | 18, <u>21</u> | | 1 | 4 | 1 |
| 2.1.2 Biological Molecules | 8, 10 | 6, 8, <u>21</u> | 7, 13 | 1, 2, 14 | 2 | 2, 4 | 4 | |
| 2.1.3 Nucleotides and Nucleic Acids | 9, 11, 18 | 9, <u>23</u> | 3 | 5, 8 | | | 1 | |
| 2.1.4 Enzymes | 6 | 7 | 8, <u>22</u> | 13 | 2 | | 4 | |
| 2.1.5 Biological Membranes | 2 | 2, 17, <u>22</u> | 4, 20, <u>22</u> | 3, <u>22</u> | 1 | 1 | | |
| 2.1.6 Cell Division, Diversity and Organisation | | 18, <u>21, 23</u> | 1, 9, 14, 19 | 10 | 3 | | | |
| 3 Exchange and Transport | | | | | | | | |
| 3.1.1 Exchange Surfaces | 19 | 4 | <u>24</u> | 4, 9, 12 | | 1, 3 | 3 | 3, 5 |
| 3.1.2 Transport in Animals | 16, 20, <u>24</u> | 11 | 6, 10, 15, <u>21</u> | 7, 20 | | | 3 | 5 |
| 3.1.3 Transport in Plants | 13, 15 | 5, 16 | 11, 17, <u>23</u> | 6, 17, 19 | | 5 | 2 | |
| 4 Biodiversity, Evolution and Disease | | | | | | | | |
| 4.1.1 Communicable Diseases, Disease Prevention and the Immune System | 5, <u>21</u> | 12 | 12 | 15, <u>21</u> | 1 | | | 6 |
| 4.1.2 Biodiversity | 12, 14, <u>23</u> | 14 | 16 | 16, <u>24</u> | 4 | | | 2, 4 |
| 4.1.3 Evolution and Classification | <u>22</u> | 13, 19 | 5, 18, <u>24</u> | 11, <u>21, 23</u> | | | | 2, 6 |
| TOTAL marks for quantitative skills (Target = 10%) | | | | | | | | |
| | 11 (16%) | 12 (17%) | 15 (21%) | 8 (11%) | 8 (11%) | 9 (13%) | 5 (7%) | 14 (20%) |
| TOTAL marks for practical skills (Target = 15%) | | | | | | | | |
| | 21 (30%) | 23 (33%) | 27 (39%) | 20 (29%) | 21 (30%) | 27 (39%) | 17 (24%) | 27 (39%) |

ZigZag Practice Exam

Supporting AS OCR

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AS Biology

Depth in Biology

Practice Paper 2A



Name

Time allowed

1 hour 30 minutes

Instructions

Answer **all** of the questions and use the space provided.
Use black ink. You may use an HB pencil for graphs and diagrams.

Information

The total marks available for this paper is **70**.



Additional marks will be awarded for the quality of written communication (QWC) in your answer whenever you see this icon.

Use of an electronic calculator is permitted.

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Paper 2A

Answer **all** the questions.

1. Cholera is a bacterial infection of the small intestine that causes diarrhoea and is responsible for the infection is *Vibrio cholerae* and most infections are caused

a) Explain how the body's immune system would deal with an infection of

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b) An oral vaccine is available to prevent individuals from becoming infected

i) Suggest why the vaccine for cholera is administered orally.

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ii) Explain how the vaccine provides protection from the disease cholera

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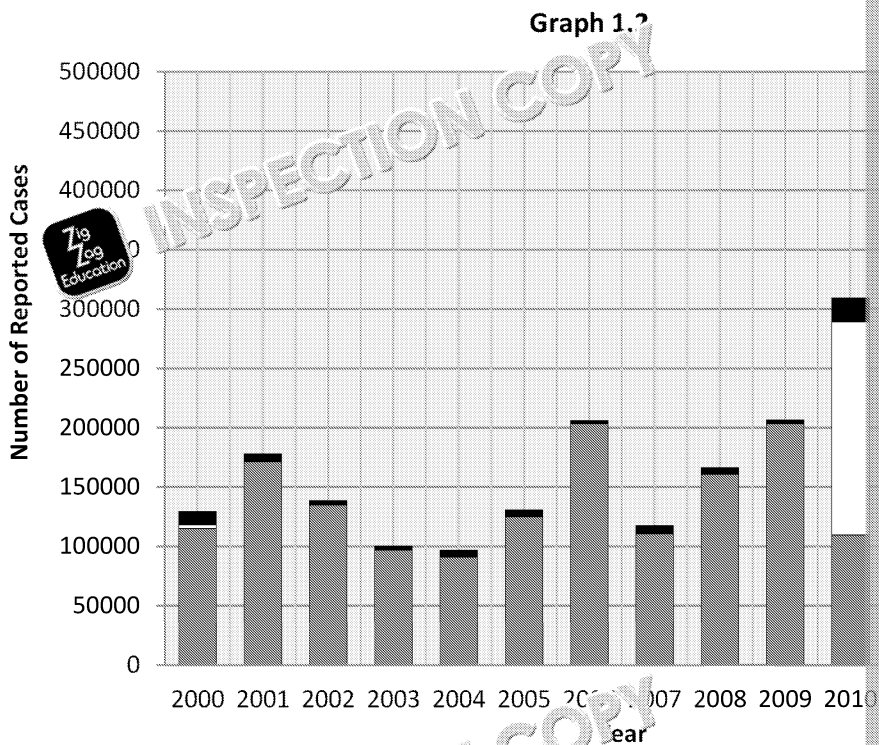
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- c) The World Health Organization (WHO) keeps detailed records on the number of reported cases of cholera across the globe.

Table 1.1 below shows the number of reported cases of cholera across Africa and America from 2000 and 2013. The data is also illustrated in **Graph 1.2**.

Table 1.1

| Year | Continent | |
|------|-----------|---------|
| | Africa | America |
| 2000 | 11160 | 3094 |
| 2001 | 171387 | 535 |
| 2002 | 135091 | 23 |
| 2003 | 97047 | 33 |
| 2004 | 91070 | 36 |
| 2005 | 125018 | 24 |
| 2006 | 203564 | 10 |
| 2007 | 110837 | 8 |
| 2008 | 160801 | 7 |
| 2009 | 203444 | 17 |
| 2010 | 109549 | 179588 |
| 2011 | 110153 | 361266 |
| 2012 | 94994 | 120433 |
| 2013 | 49465 | 61152 |



<http://www.who.int/gho/epidem>

- i) Describe the trend in the number of reported cases of cholera in Africa and America from 2000 to 2013.



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ii) Suggest an explanation for the change in reported cases of cholera in

.....
.....

iii) The WHO estimates that there are between 1.1 and 4.3 million cases
Suggest an explanation for the difference between the estimated and actual
cholera.



.....
.....

iv) Calculate the difference between the percentage decrease of cholera cases in Asia between 2000 and 2010.
Show your working.



Difference =

d) Scientists can test samples of drinking water to check for the presence of a bacterium.

A scientist has a 1 ml sample of drinking water from an area suspected to be contaminated with *Vibrio cholerae*.

Explain how the scientist could use a serial dilution to assess whether or not the water is contaminated. Also explain how the scientist would report the level of contamination using the results.

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- e) The symptoms of cholera are often treated using oral rehydration salts in water to create a salty drink.

Suggest how oral rehydration salts act to reduce the symptoms of cholera.

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2. Amylase is a digestive enzyme that breaks down starch.

- a) i) Name the three elements that make up a starch molecule.

.....

.....

- ii) Into what monomer is starch broken down by amylase?

.....

.....

- iii) What type of reaction occurs when the bonds between the monomers are broken?

.....

.....



A student carried out an investigation into the effect of temperature on the rate of starch breakdown by amylase.

The student carried out the following procedure:

- 2 cm³ starch solution, 2 cm³ amylase and 1 cm³ of buffer were added to a test tube.
- A sample of the mixture was taken every minute and added to a sample of iodine solution.
- The colour of the iodine and mixture was noted.
- The time taken for the iodine to turn orange was recorded.
- The procedure was repeated for the temperatures 20 °C, 30 °C, 40 °C, 50 °C and 60 °C.

The results of the student's experiment are recorded in **Table 2.1**.

Table 2.1

| Temperature | Time Taken for iodine to turn orange |
|-------------|--------------------------------------|
| 0 | |
| 10 | |
| 20 | |
| 30 | |
| 40 | |
| 50 | |
| 60 | |



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b) i) State one error made in the student's table.

.....

ii) What was the purpose of the buffer in the procedure?

.....

c) i) Explain why the colour did not change at 0 °C.



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ii) Compare the results obtained at 40 °C and 50 °C and suggest an explanation using your knowledge of enzymes.

.....

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d) Another student stated:

'The optimum temperature of amylase is 40 °C'

Evaluate this statement and suggest one improvement to the student's statement to have more confidence in their statement.

Evaluation

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Improvement

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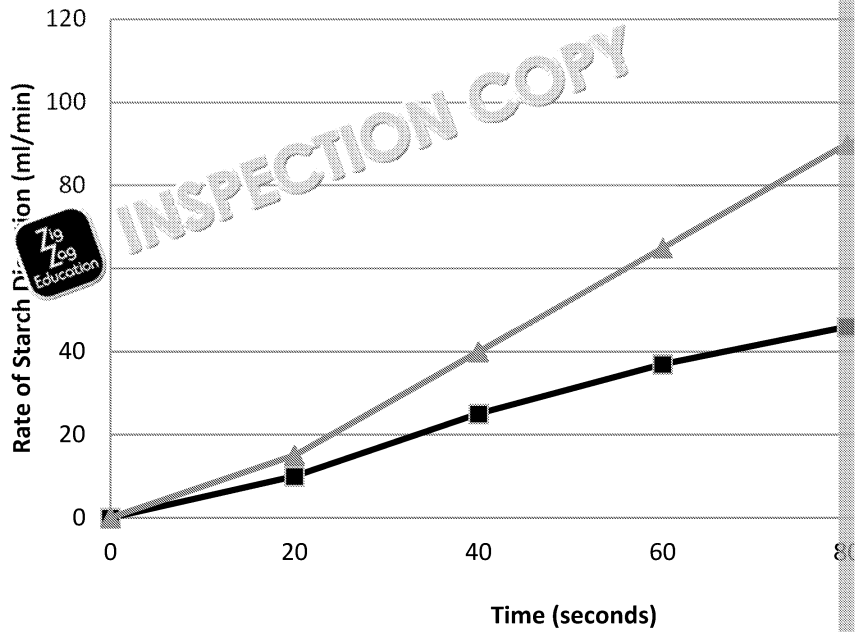


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- e) The student then carried out an investigation into the effect of inorganic ions on the rate of a controlled reaction. The results of the experiment are shown in **Graph 2.2**.

Graph 2.2



- i) State the scientific name used to describe any inorganic ion that speeds up the controlled reaction.

.....

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- ii) Give two variables that the student controlled in the investigation.

.....

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- iii) Explain the difference in the rate of reaction of amylase with the inorganic ion to without.

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3. Cell division in plants and animals shares a number of similarities.

a) i) State one difference between cell division in plants and animals.

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ii) Where in plants can dividing cells be found?

.....

.....



b) Complete the table to indicate which type of cell division, mitosis or meiosis, the cells listed.

| Type of Cell | Method of Cell Division |
|------------------|-------------------------|
| embryo | |
| xylem | |
| pollen | |
| white blood cell | |

c) Explain how meiosis results in genetic variation.



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- d) Genetic abnormalities can result when errors in cell division occur. The percentage of Down's syndrome discovered during pregnancy is increasing year on year.

Down's syndrome is a genetic abnormality. Approximately 5% of Down's syndrome is caused by a translocation of part of chromosome 21 onto the arm of chromosome 14.

- i) Suggest an explanation for the fact that the incidence of genetic abnormalities discovered during pregnancy is increasing.

.....

.....

- ii) State the test in which stage of meiosis the translocation causing Down's syndrome is discovered. Explain your answer.

.....

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- e) Table 3.1 below shows the number of children born with certain birth defects.

Table 3.1

| Genetic Disorder | Number of children |
|---|--------------------|
| Total Number of Birth Defects | |
| Chromosomal Disorders | |
| <ul style="list-style-type: none"> Down's Syndrome | |
| Multifactorial Disorders | |
| <ul style="list-style-type: none"> Phenylketonuria Sickle cell anaemia Tay-Sachs disease Phenylthiocarbamide (PTC) sensitivity Syndactyly Other | |
| Cleft Lip and Palate | |
| <ul style="list-style-type: none"> Cleft Lip Only Cleft Palate Only Cleft Lip and Palate | |

- i) What percentage of all birth defects was caused by chromosomal disorders? What percentage was caused by Down's syndrome? Show your working.

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Percentage birth defects

- ii) Studies suggest that the number of Down's syndrome cases has risen. Calculate the number of babies that would be born with Down's syndrome if the rates were accurate.
Show your working.



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Number of babies

- f) Compare and contrast the processes of meiosis and mitosis in animal cells.



In your answer you should use appropriate technical terms, spelling and punctuation.



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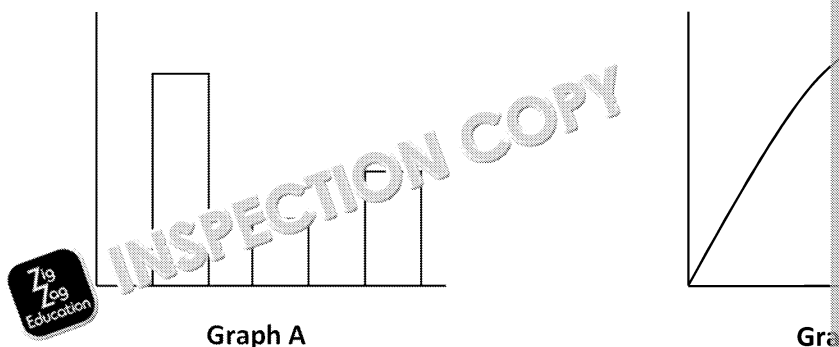
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4. a) Biodiversity is a measure of the variation in plant and animal life within a community. The graphs in **Fig. 4.1** show characteristics of human variation.

Fig. 4.1



i) Which graph, A or B, shows continuous variation?

.....

ii) Name a human characteristic that shows discontinuous variation.

.....

b) List two factors that affect biodiversity.

.....

c) Discuss the importance of maintaining biodiversity and outline some of the ways in which this can be achieved.



In your answer you should use appropriate technical terms, spelling and punctuation.

.....



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END OF QUESTIONS

Preview of Questions Ends Here

This is a limited inspection copy. Sample of questions ends here to avoid students previewing questions before they are set. See contents page for details of the rest of the resource.

Practice Paper 2B

Depth in Biology

Marking Guidelines - Abbreviations

QWC – quality of written communication; OWTTE – or words to the point. Words in **bold** within the mark scheme

| Question | | Answer |
|----------|---|---|
| 1 | a | <p>Facilitated transport involves a carrier protein / sodium-potassium pump; Facilitated diffusion involves a channel protein / carrier protein; Cell signalling involves glycoproteins / glycolipids</p> |
| | b | <p>Any TWO from:</p> <ol style="list-style-type: none"> Mechanical stability; Regulates fluidity; Waterproofs the cell |
| | c | (i) Epithelium / epithelial |
| | c | (ii) Large surface area for absorption / diffusion / active transport of nutrients / food / molecules |
| | c | (iii) Any ONE from: |
| | d | (i) (in no respiration) no respiration so no ATP; no active transport |
| | d | (ii) (no mark) No change in rate of absorption; No energy / ATP required (for facilitated diffusion) |
| | d | (iii) Volume / mass of sugar absorbed divided by time |
| | d | (iv) Sugar A; A = 61.3%; B = 41.6% |
| e | <p>Any THREE from:</p> <ol style="list-style-type: none"> Cell support / stabilisation / cytoskeleton, maintain shape; Movement / crawling / cilia / undulipodia; Change shape of cell / endo / exocytosis; Organelles in place; Moves vesicles; Moves chromosomes / mRNA; Forms spindle / centrioles | |

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| Question | Answer | Marks | | |
|----------|---|--|---|---|
| 2 | a | It will have an additional hydrogen atom | 1 | |
| | b | (i) | Any THREE from: 1. Specify dropping volume (i.e. use a pipette); 2. Use a colourimeter / observe colour change; 3. Standardisation of DCPIP; 4. Repeat three times for each juice; 5. Use AVP | 3 |
| | | b | The procedure is not reliable / has low reliability as there have been no repeat measurements | 1 |
| | | (iii) | Use water instead of juice | 1 |
| | | (iv) | Strong acid would cause the DCPIP to turn pink and, therefore, the results would be unclear (OWTTE) | 1 |
| | | (v) | 1.25 mg (units required) | 3 |
| | c | Any THREE from: 1. (glucose and fructose are) reducing sugars; 2. Use Benedict's reagent / copper (II) ion; 3. Heat sample of sugar / juice with Benedict's reagent / copper sulphate; 4. Solution will change from blue to orange / red in presence of (reducing) sugars; 5. Precipitate forms | 3 | |
| d | Any TWO from: • Formula for glucose – $C_6H_{12}O_6$; • Condensation reaction occurs / molecule of water is lost; • Glycosidic bond is formed; • Maltose is formed; • Catalysed by an enzyme | 3 | | |
| 3 | a | Trace must have a minimum of 10 / maximum of 20 peaks | 2 | |
| | b | To absorb / remove the carbon dioxide breathed out by the patient | 1 | |
| | c | Data logger | 1 | |
| | d | Level 3 (5–6 marks): There is a detailed description of the structure and function of each type of tissue found in the lung. Level 2 (3–4 marks): There is a description of the structure and function of most types of tissue found in the lung. OR | 6 | |

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| Question | Answer | Marks |
|----------|---|-------|
| | <p>There is a very good description of either structure or function of each type of tissue found in the lung.</p> <p>Level 1 (1–2 marks): Describes structure and function of tissues in the lung but lacks detail.</p> <p>0 marks: No response or no creditworthy response.</p> | |
| e | (i) 80% | 2 |
| e | (ii) Higher metabolic rate / more active | 1 |
| e | (iii) 24 breaths per minute (units required) | 1 |
| | | |
| 4 | <p>Level 3 (5–6 marks): There is a detailed description of the properties of water, linking them to its role in living organisms. Appropriate terminology is used correctly throughout.</p> <p>Level 2 (3–4 marks): There is a description of most of the properties of water, using some appropriate terminology to link them to its role in living organisms.</p> <p>OR</p> <p>There is a very good description of either the properties of water or the role of water in living organisms.</p> <p>Level 1 (1–2 marks): Describes the properties of water and its role in living organisms but lacks detail.</p> <p>0 marks: No response or no creditworthy response.</p> | 6 |

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| Question | | Answer | Marks |
|----------|---|--|-------|
| 5 | a | Assimilate – sucrose; Source – leaf; Sink – roots / developing fruits / flowers | 3 |
| | b | (i) Sieve tube elements | 1 |
| | b | (ii) More cytoplasm, more mitochondria, more cytoplasm | 2 |
| | b | (iii) Sucrose | 1 |
| | b | (iv) Any TWO from: 1. Companion cells have nucleus / mitochondria; 2. Companion cells have more cytoplasm; 3. Sieve tube elements have cross walls; 4. Sieve tube elements have thinner walls | 2 |
| | b | (v) To provide ATP; For active loading of sucrose / to pump H ⁺ ions out of companion cell | 2 |
| | c | 3; 2; 1; 3 | 4 |

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Preview of Answers Ends Here

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