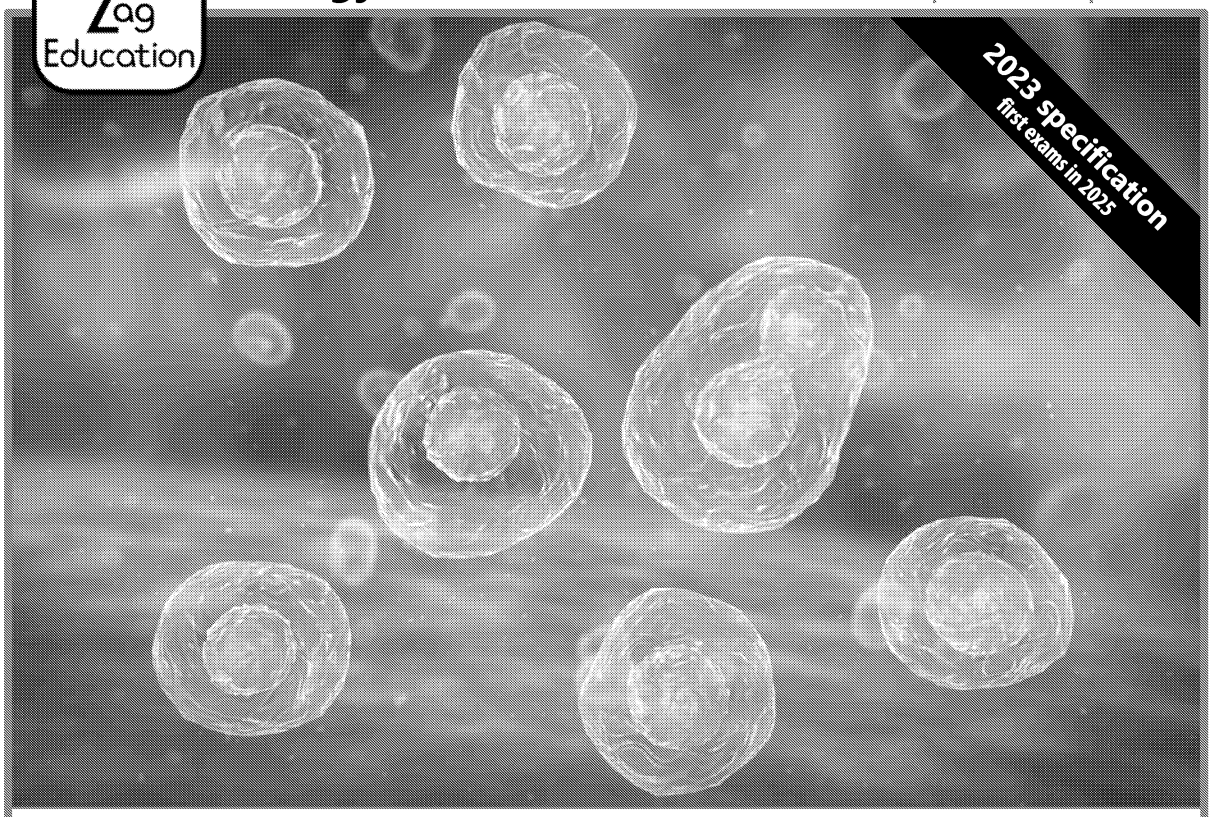
Zig Zag Education

Biology

A Level | OCR A | H420



Practice Exams for A Level OCR Biology A

Paper 1: Biological Processes

Update v1.3, June 2024

zigzageducation.co.uk

POD 7601

Contents

Teacher's Introduction

This pack contains four Practice Paper 1s for the OCR A Level Biology (A) specification H420 (first teaching September 2015). The papers and corresponding mark schemes in this pack are modelled on the sample assessment material provided by the board.

Paper 1 is entitled 'Breadth in Biology' and covers:
- Module 2: Foundations in Biology
- Module 3: Exchange and Transport
- Module 5: Communication, Homeostasis and Energy

Paper 2 is entitled 'Depth in Biology' and covers:
- Module 2: Foundations in Biology
- Module 4: Biodiversity, Evolution and Disease
- Module 6: Genetics, Evolution and Ecosystems

Paper 3 is entitled 'Unified Biology' and covers all modules, with an emphasis on practical skills and 'How Science Works'.

This paper is designed so it can be used as either a mock examination or a revision activity. The mark scheme is designed with both students and teachers in mind, allowing students to mark their own work and assess their progress. Otherwise, the mark scheme resembles that produced by OCR in its sample assessment material.

Each practice paper contains both short and longer questions in proportion to the sample assessment material. These include factual recall, explanation and discussion questions, with two 6-mark Level of Response questions per paper. Papers have been designed to ensure that the Mathematical Skills and Practical Activity Groups (PAGs) specified in the new syllabus are assessed.

Across the three Practice Paper packs (Papers 1, 2 and 3), coverage of the specification is complete. A specification analysis grid is also included, enabling teachers to identify questions relevant for tests and exam-technique activities, or as homework assignments.

The authors have aimed to include a spread of material from the relevant topics in each paper, allowing teachers to obtain an overview of their students' knowledge and understanding for each unit.

We hope you and your students find this pack useful.

C Johnson and L Mills, April 2017

Update v1.1, 25 September 2017
Paper 1A, Question 20 d) ii) on page 126 – the essential cofactor has been corrected to 'Chloride ions (Cl^-)'.

Update v1.2, 20 September 2018
Paper 1B, Question 16 a) ii) on page 128 – answer updated to include several other factors
Paper 1B, Question 17 a) iii) on page 129 – answer has been corrected to 'sunlight energy'
Paper 1B, Question 18 a) iii) on pages 31 and 93 – significant figures in table have been corrected to be consistent
Paper 1B, Question 19 a) ii) on page 132 – answer corrected to 'allows auxins to diffuse through the plant'
Throughout, on pages 13, 27, 49, 62, 70, 73, 82, 91, 104, 112, 117 and 118 – diagrams updated to remove arrow heads on label lines

Update v1.3, 5 June 2024
Changes have been made to reflect the 2023 accessibility and clarity amendments to the specification:
- Paper 1C, Question 17 b) vi) on page 139 – answer updated to remove renal dialysis
- Paper 1C, Question 20 b) iii) on page 143 – answer updated to remove vacuolar pathway
- Paper 1D, Question 16 b) iii) on page 146 – answer updated to remove reagent testing strips
- Paper 1D, Question 20 b) iii) on pages 74, 119 and 152 – additional marking point added
- Paper 1D, Question 20 c) ii) on pages 75, 119 and 152 – one marking point removed

Specification Cross-reference

	A Level Paper 1 (A) Biological Processes	A Level Paper 1 (B) Biological Processes	A Level Paper 1 (C) Biological Processes	A Level Paper 1 (D) Biological Processes	A Level Paper 2 (A) Biological Diversity	A Level Paper 2 (B) Biological Diversity	A Level Paper 2 (C) Biological Diversity	A Level Paper 2 (D) Biological Diversity	A Level Paper 3 (A) Unified Biology	A Level Paper 3 (B) Unified Biology	A Level Paper 3 (C) Unified Biology	A Level Paper 3 (D) Unified Biology
Module 1												
1.1 – Practical skills												
1.1.1 Planning	17	16	16		20		17, 18		1, 2	2, 4	1, 3	4
1.1.2 Implementing			16	17		19			1, 5		2, 3	4
1.1.3 Analysis	17	16		16, 17	21	17, 19		19, 21	3, 5	3, 4	2	2, 5
1.1.4 Evaluation					17	16, 21	17	17, 19, 22	2, 3, 5	4	1, 3, 4	2, 3, 5
Module 2: Foundations in Biology												
2.1 – Foundations in biology												
2.1.1 Cell structure	1, 16	1, 15, 19	1,2, 18	1, 2, 16, 17	1, 14	20				1	1	1
2.1.2 Biological molecules	17	2, 17, 20	3, 16	3, 9	2, 17	1, 12	1, 9, 15, 22	1, 16, 20	1	2, 4	2, 5	3
2.1.3 Nucleotides and nucleic acids		3, 7	4, 19	4	3, 15	2, 13	2	2			3	
2.1.4 Enzymes	17, 20	4, 17, 19	14, 18	5, 6, 17, 20				20		3		1, 2
2.1.5 Biological membranes	6	5, 6, 17	5	19, 20	4	3, 14		1				1
2.1.6 Cell division, cell diversity and cellular organisation	7		6	16	5	4		21	1	1		
Module 3: Exchange and Transport												
3.1 – Exchange and transport												
3.1.1 Exchange surfaces		20	7, 8, 13, 16						3	4		
3.1.2 Transport in animals	2, 4, 9, 19	17, 20	16, 17	18						5	5	
3.1.3 Transport in plants	10, 11, 16, 20	9, 16, 18, 19	9, 20						4	3		4
Module 4: Biodiversity, Evolution and Disease												
4.1 – Communicable diseases, disease prevention and the immune system												
4.1.1 Communicable diseases, disease prevention and the immune system					6, 16	5, 15, 17, 20	3, 7, 10, 19	4, 16, 20		1, 2	4	1, 5

	A Level Paper 1 (A) Biological Processes	A Level Paper 1 (B) Biological Processes	A Level Paper 1 (C) Biological Processes	A Level Paper 1 (D) Biological Processes	A Level Paper 2 (A) Biological Diversity	A Level Paper 2 (B) Biological Diversity	A Level Paper 2 (C) Biological Diversity	A Level Paper 2 (D) Biological Diversity	A Level Paper 3 (A) Unified Biology	A Level Paper 3 (B) Unified Biology	A Level Paper 3 (C) Unified Biology	A Level Paper 3 (D) Unified Biology
4.2 – Biodiversity												
4.2.1 Biodiversity					7, 20	6, 16, 20, 21	4, 11, 17, 21	6	2	3	4	2
4.2.2 Classification and evolution					8, 17, 18	7	5, 16	5			1, 3	
Module 5: Communication, Homeostasis and Energy												
5.1 – Communication and homeostasis												
5.1.1 Communication and homeostasis	3, 12	10, 12, 14, 20	10	8, 16, 19								
5.1.2 Excretion as an example of homeostatic control	13, 17	11, 17	11, 17	20							5	
5.1.3 Neuronal communication	14		16, 17	10, 19						5		3
5.1.4 Hormonal communication	17, 19	13	12	11, 16								3
5.1.5 Plant and animal responses	8, 15, 18, 20	8, 19	20	7, 12						5	2	3, 4
5.2 – Energy for biological processes												
5.2.1 Photosynthesis	5, 20	18	18	13, 15, 17						3	2	1, 4
5.2.2 Respiration	18, 20	19	15, 19	14, 18					5	4	5	
Module 6: Genetics, Evolution and Ecosystems												
6.1 – Genetics and evolution												
6.1.1 Cellular control					9, 19	8, 19	6, 12, 16	15, 21	1, 4			
6.1.2 Patterns of Inheritance					17, 18	16, 18	16, 20	7, 14, 17, 18		3		
6.1.3 Manipulating genomes					10, 17, 19	9, 16, 17	13, 17, 19	12, 13, 18			1, 3	
6.2 – Cloning and biotechnology												
6.2.1 Cloning and biotechnology					11, 21, 22	10, 19	17, 18	9, 10, 11, 16	4, 5			
6.3 – Ecosystems												
6.3.1 Ecosystems					12, 20, 22	21	22	19	2			
6.3.2 Populations and sustainability					13	11	8, 14, 21	8, 22	2	3		2

A Level Biology

Biological Proc[illegible]

Prac[illegible] Paper 1A

Name	

Time allowed
2 hours 15 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 th[illegible] is **100**.
Quality of extended r[illegible] questions are marked with a star (*).
Use of an [illegible] calculator is permitted.

Section A

1. Which of these cell organelles is **not** bound by a double membrane?

   A Mitochondrion
   B Rough endoplasmic reticulum
   C Chloroplast
   D Ribosome

   Your answer ☐

2. The cardiac cycle describes the dynamics of each part of the heart during

   Which of these descriptions of **ventricular systole** is correct?

	Ventricle	Atrium	Blood movement
A	Contracts	Contracts	In to heart
B	Relaxes	Contracts	Out of heart
C	Contracts	Relaxes	Out of heart
D	Relaxes	Relaxes	In to heart

   Your answer ☐

3. Iden[illegible]hich of the following options is **not** true regarding endothermy

   A A significant proportion of the body's energy is spent on maintaining
   B Increased metabolic demand requires more food to be consumed.
   C Growth is limited during winter, because energy use for temperature
   D Increased risk of predation at certain times of day due to thermoreg

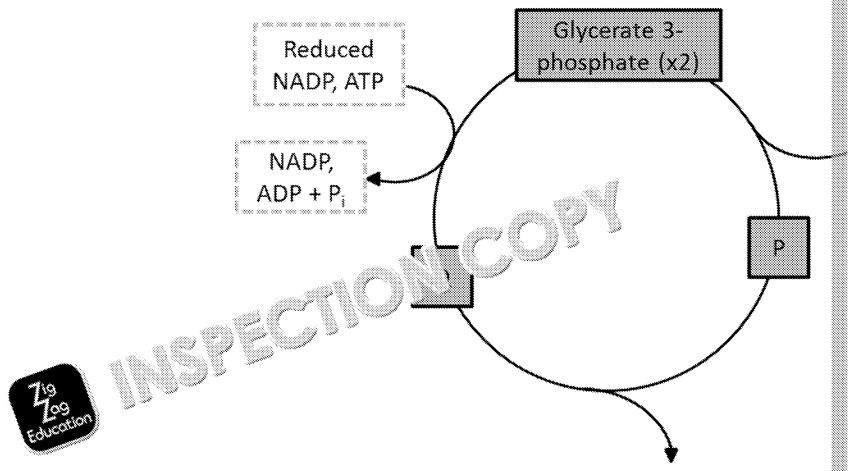
   Your answer ☐

4. A patient has a vital capacity of 3.4 dm^3 and a tidal volume of 0.6 dm^3. Th
   spirometer, taking 14 breaths in a minute. W[illegible] th[illegible] patient's pulmona

   A 4.1 $dm^3\ min^{-1}$
   B 8.4 $dm^3\ min^{-1}$
   C 23.2 dm[illegible]
   D [illegible]$m^3\ min^{-1}$

   Your answer ☐

5. The diagram below shows a simplified Calvin cycle. Identify molecules P a



A P – Hexose bisphosphate, Q – Triose phosphate
B P – Ribulose bisphosphate, Q – Triose phosphate
C P – Rubisco, Q – Ribulose bisphosphate
D P – Ribulose bisphosphate, Q – Rubisco

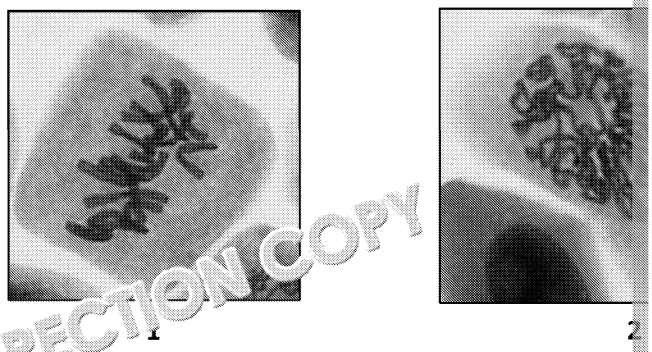
Your answer ☐

6. Choose the row of the table which describes facilitated diffusion.

	Down/against concentration gradi…	ATP energy requir…
A	Against	Yes
B	Down	Yes
C	Against	No
	Down	No

Your answer ☐

7. Which stage of mitosis is occurring in the two cells shown below?



A 1 – Me…, 2 – Telophase
B …etaphase, 2 – Prophase
C 1 – Prophase, 2 – Anaphase
D 1 – Telophase, 2 – Prophase

Your answer ☐

8. Choose the row which correctly describes how fruit producers may use p

Commercial uses for plant hormones	Auxins	Ethene
A	Preventing fruit fall	Encouraging fruit r
B	Producing seedless fruit	Encouraging fruit r
C	Preventing fr[illegible]	Growing larger f
D	[illegible] larger fruit	Producing seedless

Yo[illegible]ve.

9. Multicellular animal bodies use blood vessels to transport substances th

Which of these statements best describes the structure of medium and l

A The artery walls are dominated by collagen and contain little, or no

B The artery walls contain cardiac muscle to maintain blood pressure.

C The outer layer of the artery walls are dominated by collagens and t

D The artery walls contain many globular proteins to provide strength.

Your answer

10. Which of these descriptions of transpiration is correct?

	[illegible] polarity of water	Controlled by stomata	Uses the vess
A	No	Yes	N
B	Yes	No	Ye
C	No	No	N
D	Yes	Yes	Ye

Your answer

11. A potometer is used to measure the rate of transpiration. A bubble mov

What is the correct rate of transpiration?

A 0.13 mm s^{-1}

B 0.24 mm [illegible]

C [illegible] m[illegible] s

D [illegible]nm s^{-1}

Your answer

12. Which system below is an example of negative feedback?

A The death of an area of heart tissue causes inadequate blood flow w
more heart tissue to be at risk of dying.

B A breastfeeding infant causes its mother to produce prolactin, a horm
production.

C The presence of partially-digested proteins in th stomach triggers t

D ATP is created by glycolysis; ATP inhib h phofructokinase, one o

Your answer ☐

13. The loop of Henle performs a vital function in the control of the water po
osmoregulation.

Which of these statements about the loop of Henle is incorrect?

Statement 1 – The descending limb leads from the proximal convoluted t

Statement 2 – The descending limb has low permeability to both sodium

Statement 3 – Movement of ions in the first part of the ascending limb is

Statement 4 – The ascending limb is impermeable to water.

A Statement 1 only

B Statements 1 and 2

C Statement 3 only

D Statements 3 and 4

Your answer ☐

14. The longest neuron in nature is estimated to be approximately 25 metres

How long does it take an impulse travelling at 120 m s^{-1} to travel the leng

A 4.8 s

B 0.2 s

C 3 s

D 0.02 s

Your answer ☐

15. Which of the following descriptions of tropisms in plants is correct?

A Positive tropism i e pr th away from a stimulus in order to prote

B Negati only occurs in response to sunlight.

C ms are all slow responses, which take place over days or week

D Plant hormones are produced across the plant and not in a specialise

Your answer ☐

Section B

16. All large plants undergo transpiration – water evaporates from the leaves which pulls water up through the xylem from the roots. Transpiration is e but it also causes the plant to lose water. The rate of transpiration can b

A student has set up a potometer to study tr... at...n in a healthy, vas

The experimental set-up is sho... ure 1.

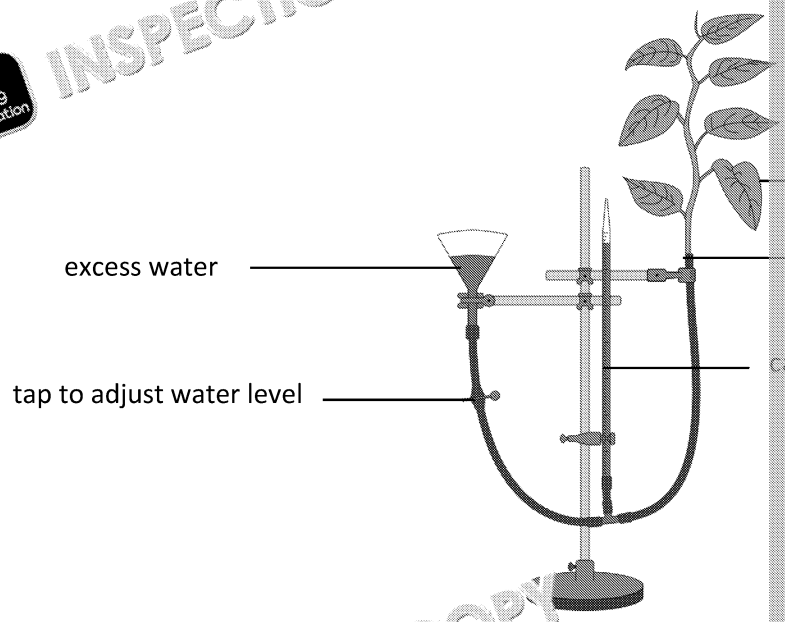


Figure 1

a) The results ... experiment are shown in **Table 1**.

Light intensity (AU)	Mean distance of bubble m... (cm)
4	12.0
2	6.0
1	3.0
0.5	1.5

Table 1

The tube from which these results were measured was 0.8 cm in dia...

i) Calculate the volume of water that was ... at a light intensity o...

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The student intends to assess the number of stomata on the leaves o

Using a light microscope, they image the stomata, and claim that th

ii) In terms of magnification and resolution, explain whether you a

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The student covers the lower surface of the leaves with petroleum j
acts as a barrier between the leaf and the environment.

iii) Suggest, with explanation, the expected outcome of this experi

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In a separate experiment, the student place[illegible] plant in a transpar
experiment, maintaining all other va[illegible]s before, in order to tes
around the plant.

iv) Explain [illegible]ance of the bag being transparent, and predi
[illegible]changed by this experiment.

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17. Tyrosine kinases are enzymes involved in phosphorylation and activation
tyrosine kinase gets its name from one of its monomers, tyrosine, which
and transfer that phosphate group to other molecules. The monomer ty

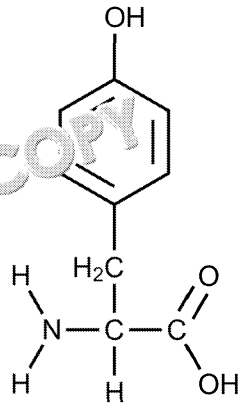

Figure 2

a) i) Suggest which group of biological molecules tyrosine belongs t

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Under certain conditions, two tyrosine monomers can join togethe
Figure 3.

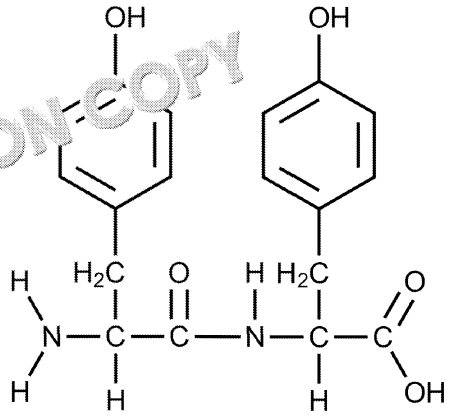

Figure 3

ii) Give the name of the chemical reaction that forms this type of
products are in this reaction.

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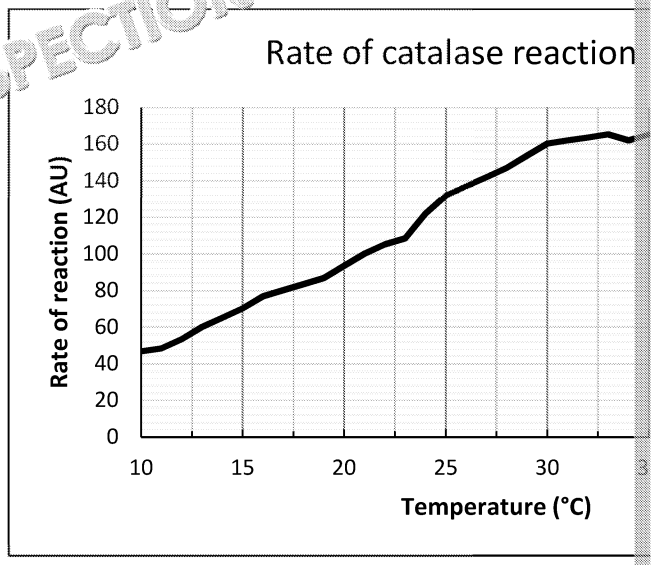
b) Another example of a polymer is catalase. Catalase is an enzyme th
functions to break down hydrogen peroxide. An in vitro experiment
the rate of catalase activity at varying temperatures.

The breakdown products of this reaction are water and oxygen. The

The graph below shows the results of the in vitro experiment.



i) Calculate the temperature coefficient o catalase enzyme b

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ii) Suggest a possible method for recording the rate of this reactio

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The oxidation of fatty acids and amino acids as respiratory substrate
production of hydrogen peroxide as a waste product. Without the b
can damage DNA and disrupt cell membr any tissues, includ
produce catalase.

iii) Suggest why liver cells produce relatively high amounts of catal

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c) Figure 4 below shows the histological structure of the liver.

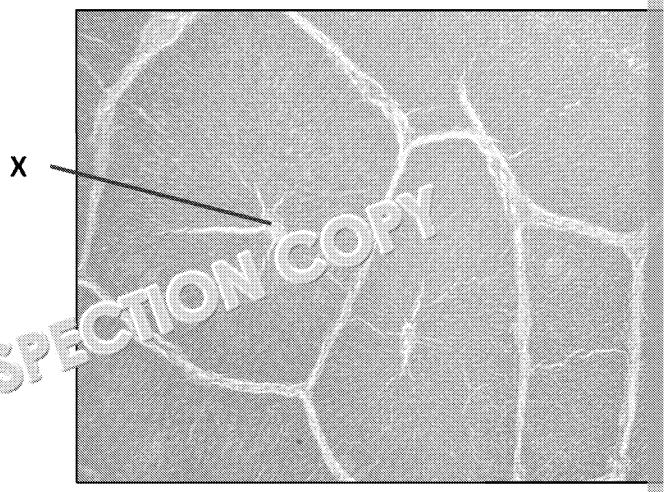

Figure 4

i) Identify the features in the figure above labelled:

X: .....

Y: .....

ii) Briefly outline a method for measuring the diameter of the feat

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In addition to its role in detoxification, the liver also plays an essenti
during glucose homeostasis.

iii) Explain how homeostatic regulation causes glycogen to be stor

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18. Respiration and photosynthesis are both processes with an extremely an
have developed from a single process, which evolved in bacteria over thr
of photosynthesis and respiration have many similarities.

a) Describe the relationship between the products of respiration and p

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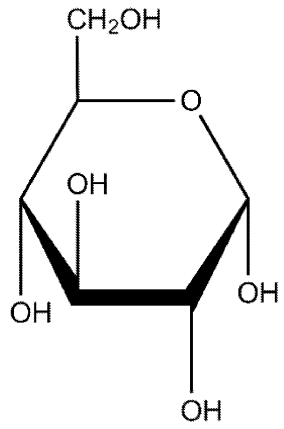

Figure 5

b) Alpha glucose and beta gluc[illegible]h[illegible]ve the same chemical formu
molecule. Both alph[illegible] glucose molecules have the formula

Explain how it is possible to tell that the molecule in Figure 5 is α-glu

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c) Glucose is broken down into pyruvate by glycolysis. In aerobic respi
reactant in the link reaction.

i) Outline the process of the link reaction.

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ii) The Krebs cycle produces reduced NAD, which donates hydroge
and electrons during oxidative phosphorylation. The hydrogen i
mitochondrial intermembrane space against a concentration gr

Explain how the energy used to move the hydrogen ions is gene

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d)* The process of anaerobic respiration is different from that of aerobi
respiration involves the conversion of pyruvate into ethanol and car
controlled reactions. Humans also carry out anaerobic respiration u
pyruvate into lactate and releasing NAD for reuse in glycolysis. Lact

Discuss the advantages and disadvantages of anaerobic respiration,
anaerobic respiration are greater for active, multicellular organisms
as yeast.

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e) An experiment is carried out into the effects of weightlifting on rate
blood samples are taken from the muscle tissue of five subjects, bot
completing sets of weights. The pH of the blood samples is measure

i) Give a reason for the expected change in the lactate concentrati
increased rate each set.

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ii) During exercise, muscles repeatedly contract and relax. Explain in the muscle leads to muscle contraction.

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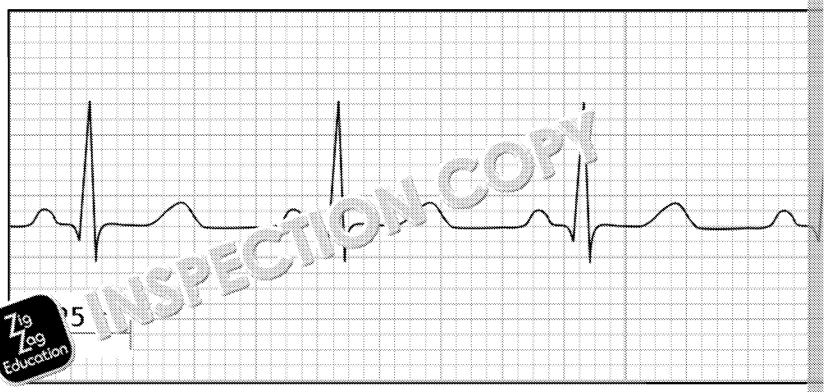
19. a) An ECG is a common test used in hospitals to assess the activity of t the skin, where they detect small changes in electrical potential cau below illustrates the heartbeat of a person under physical stress.



i) Using the data above, calculate the heart rate.

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ii) Describe one way in which the graph above would change for a

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b) The heart must beat regularly to pump blood around the body, supp
removing carbon dioxide from actively respiring tissues. The blood t
muscle cells to the lungs for excretion.

One of the methods by which the carbon dioxide is transported to t
statement, one error is present.

i) In each case, **underline** the error, statin[illegible]orrection in the allo

Sta[illegible]	
M[illegible]e carbon dioxide is bound to haemoglobin.	
In the plasma, the enzyme carbonic anhydrase catalyses the reaction between carbon dioxide and water to form carbonic acid.	
The dissociation of carbonic acid results in ion formation. H^+ ions diffuse out of red blood cells and are replaced with Cl^- ions which diffuse in. This is known as chloride shift.	

Although the blood supplies oxygen to all pa[illegible] the body, and rem
have greater requirements than othe[illegible]

ii) Carbon dioxide i[illegible] concentration in actively respiring tis
how hig[illegible]s can increase oxygen supply to a muscle tiss

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c) In order to perform s[illegible] respiration, glucose must be taken up
the uptake of g[illegible] cells. Few cells readily present receptors fo
a[illegible]or insulin, and both liver and muscle cells can perfo
tion. Glucose receptors presented by cells that lead to glucos

i) Define 'glycogenesis'.

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ii) Outline the processes that lead to insulin-mediated GLUT4 pres

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20. a) Paraquat is an organic chemical that can be used as a herbicide. He the viability of unwanted plants. Paraquat is an antioxidant and ac transferring them to molecular oxygen.

i) What is a photosystem?

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ii)* Using the infor given at the start of this question, descri photos and explain how the herbicide works to kill wee

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The manufacturers recommend that paraquat is kept out of the rea
to humans, even in small doses.

iii) Identify the processes which lead to toxicity in humans.

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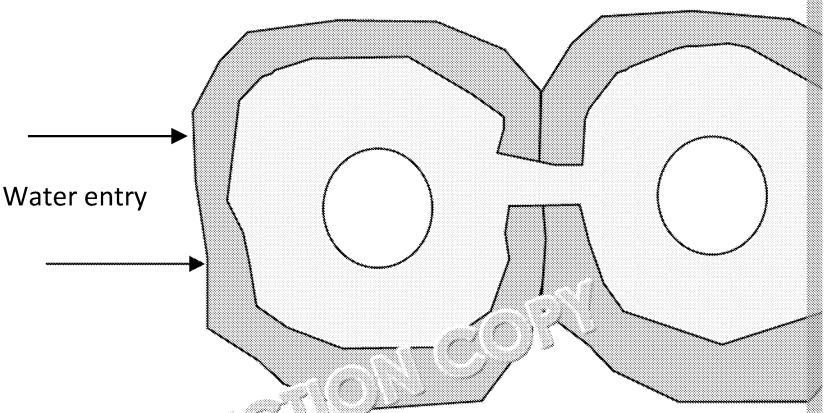
b) Water is an essential factor required by plants for photosynthesis. I
embedded in the soil.

The image below shows three cells in the root of a plant cell.



n the diagram, draw how water moves across the root by the s

ii) What is the name of the waterproof band that runs around end

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iii) Metabolic poisons may prevent respiration from occurring and
movement of water from soil to xylem is not fully inhibited by t

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c) Plants are able to detect sunlight and respond to maximise their ph
some chemical factors that are able to cause multiple responses. A
a process known as phototropism.

Outline the process by which auxin increases photosynthetic efficie

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d) Commercially, gardeners also make use of these hormones.

Bananas are grown in tropical climates, and are transported over lo
14 days from picking.

i) Describe the methods farmers might use to protect against los

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ns are ripened naturally by the action of the enzyme amylase.

ii) Of the amylase enzyme, what is the:

Product: .....

Substrate: .....

Essential cofactor: .....

[TOTAL 100 MARKS]

Preview of Questions Ends Here

Practice Paper 1B

Section A

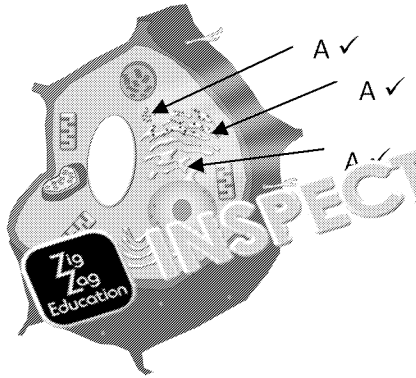
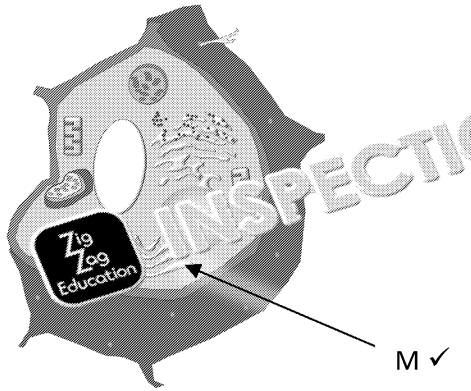
Question	Answer	Marks
1	B	1
2		1
3	B	1
4	D	1
5	C	1
6	A	1
7	D	1
8	C	1
9	C	1
10		1
11	B	1
12	A	1
13	C	1
14	A	1
15	D	1

Section B

Question			Answer	Marks
16	a)	i)	**Assimilate**: The result of combining and converting biochemicals for use by a plant ✓ **Source**: The region of the plant from which assimilates are moved ✓ **Sink**: The region of the plant to which assimilates are moved ✓	3
		ii)	**ANY TWO FROM OTHER VARIABLE INCLUDING:** Number of aphids ✓ Size of plant ✓ Conditions in which plant is kept (e.g. temperature, humidity, CO_2 concentration) ✓ Age of aphids ✓ Distance from source / to sink ✓ Species of plant ✓	2
		iii)	**THREE, in logical order:** Transpiration reduces photosynthetic products from the source ✓ Photosynthesis is not as pronounced during the early morning ✓ Increases active loading into the phloem ✓ Increased loading into phloem increases pressure ✓ Explains why more drips are observed during the middle of the day ✓	3
		iv)	Predict that rate of dripping decreases as sun decreases **AND** Rate of photosynthesis decreases in evening ✓	1
17	a)	i)	**ANY ONE OF:** Nucleolus ✓ Endoplasmic reticulum ✓	1
		ii)	In nucleus (of eukaryote) the DNA is linear; in mitochondria the DNA is circular ✓ **OR** In nucleus (of eukaryote) the DNA is wrapped around proteins; In mitochondria the DNA is loose ✓	1

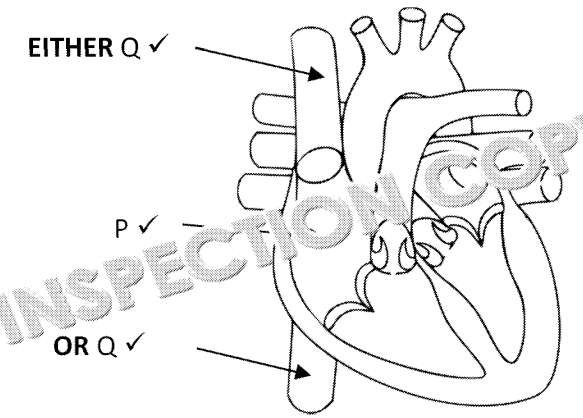
Question			Answer	Marks	
		iii)	**THREE, in logical order, from:** Chloroplasts produce glucose from sunlight energy ✓ In nutrient-poor environments, it is likely that the (larger) cells [illegible] unable to find nutrients to survive ✓ By performing endosymbiosis, (larger) c[illegible] ensure a supply of glucose from chloroplasts for the cell ✓ Increased chance [illegible] passing on genes ✓	3	
	b)	i)	[illegible]uctokinase is involved in making ATP (through glycolysis), **AND** High ATP concentration leads to <u>product inhibition</u> of phosphofructokinase ✓ Reduces production of ATP when not required ✓	2	M A
		ii)	Less ATP would be produced by the cell ✓ (ATP is) required for active transport / endocytosis / ex[illegible]osis, [illegible]e rate of these processes would decrease ✓	2	1 1
		iii)	(Hydrostatic pressure resul[illegible] from th[illegible] force of blood in vessels) Causes fluids a[illegible] [illegible]olecules to be removed from capillaries ✓ C[illegible]ssure results as high solute pressure remains, causing water to mo[illegible] into blood ✓ Venous hydrostatic pressure is low, so net movement of fluid back into the venule occurs ✓	3	M 1
	c)	i)	<table><tr><td>Protein</td><td>74.6</td><td>0.0</td></tr></table> ✓	1	
		ii)	$\frac{902.9}{912.2} \times 100 = 98.98\ \%$ ✓	1	
		iii)	1: Urea ✓ 2: Glucose ✓	2	1
18	a)	i)	AT[illegible]	1	

Question			Answer	Marks
		ii)	**Level 3 (5–6 marks)** Thorough comparison of both mechanisms, giving detailed explanations for each example. Terminology is consistent and correct. **Level 2 (3–4 marks)** A clear, thorough explanation of th[illegible]s, with emphasis on one example or the other. Te[illegible]logy [illegible]ostly consistent and correct, **[illegible]–2 [illegible]** S[illegible]anation of mechanisms, showing partial understanding of the processes. Terminology is inconsistent or incorrect. **0 marks** No response or no correct points in response.	6
		iii)	*Light intensity* = $\frac{1}{10^2} = 0.01$ ✓ **OR** $\frac{0.04}{4} = 0.01$ ✓	1
		iv)	Co[illegible]s, with x-axis showing light intensity **AND** appropriate scale on each axis ✓ Points correct and accurately plotted ✓ Points joined with straight line ✓ Gradient = 2.5 (± 0.1) ✓✓	5
	b)		**TWO FROM:** Companion cell[illegible] ✓ Si[illegible] ✓ Mar[illegible]ochondria ✓	2

Question			Answer	Marks
	c)		Limiting factors are factors that limit the rate of a reaction, such as photosynthesis. ✓ Any named example (i.e. light: greater light, more photosynthesis occurs.) ✓ Can use greenhouses to modify the amount of light/ carbon dioxide available/temperature at which plants are grown. **OR** Use fertilisers to increase the availability of inorganic ions. ✓ Increase productivity of farm/ allow farmer to increase yield (causing potential increase in profits). ✓	4
19	a)	i)	I: Any of:  	1
			II:  	1

Question			Answer	Marks
		ii)	Auxins are produced at the apical tip ✓ Removal of the apical tip will remove apical dominance ✓ However, placing gelatine beneath tip allows auxins to diffuse t[illegible] plant ✓ Apical dominance remains, as auxin-producing tip [illegible]	4
	b)	i)	53.6 % ✓	1
		ii)	Increase temperature Increase enzyme concentration Increase substrate concentration	2
		iii)	Diffusion from high concentration to lo[illegible]ation / down concentration gradient ✓ Adaptations (any [illegible] for diffusion distance / broad / spongy ✓	2
	c)	i)	[illegible] the final hydrogen acceptor in electron transport chain and gl[illegible]ols ✓ Needed to oxidise coenzymes ✓ Without oxidation, the coenzymes cannot be reduced ✓	3
		ii)		1
		iii)	C[illegible]ed to use glucose for respiration ✓ Lip[illegible]equire transformation, reducing efficiency ✓ (Glycerol coverted to glycerol-3-phosphate; fatty acid chain to acetyl groups) RQ of glucose is 1.0 ✓	3

	CO_2 produced (mL)	O_2 consumed (m[illegible])	Re[illegible]atory quotient (RQ)
Rapeseed oil	7.60	10.[illegible]3 ✓	0.75

Question			Answer	Marks
20	a)	i)	<table><tr><th></th><th>Single</th><th>Double</th></tr><tr><td>Open</td><td>✓</td><td></td></tr><tr><td>Closed</td><td></td><td></td></tr></table>	1
		ii)	Greater size (in human) Greater m[illegible] and (in human) ✓ [illegible]rface area : volume ratio (in human) ✓	3
		iii)	 EITHER Q ✓ P ✓ OR Q ✓	2
		iv)	Family: Proteins ✓ Properties (*any of)*: Can withstand high strain / have elastic properties / afford a lot of strength ✓	2
	b)	i)	D ✓ B ✓	2
		ii)	Chamber fill[illegible]en resting on water ✓ [illegible]eat[illegible] into and out of chamber, causing lid to rise and fall (as vo[illegible]anges) ✓ Pen (attached to the spirometer) draws a trace on a rotating drum (kymograph) ✓	3

Question			Answer	Marks
		iii)	Carbon dioxide is absorbed by soda lime ✓	1
		iv)	Negative (feedback) ✓	1
	c)	i)	*(Baroreceptors)* detect change in blood pressure; gives feedback about the water content of blood / volume of blood. *(Chemoreceptors)* detect change in the chemical composition of blood; gives feedback about the blood / carbon dioxide levels in the blood. ✓	2
		ii)	**Level 3 (5–6 marks)** Clear, thorough explanation of adrenaline activity, with adrenaline's effects and their survival value clearly linked. *Well-constructed explanation, with relevant and correct information. Terminology is consistent and correct.* **Level 2 (3–4 marks)** A mostly complete explanation of adrenaline activity and its survival value. The two concepts are explained and not consistently linked together. *These is an attempt at explanation, with mostly relevant and correct information. Terminology is mostly consistent and correct.* **Level 1 (1–2 marks)** Some attempt to explain adrenaline's activity and its survival value. *The explanation is partial and limited, and links between activity and survival value are not made. Terminology is inconsistent or incorrect.* **0 marks** No response or no correct points in response	6

Preview of Answers Ends Here