

**Trial Examination 2022** 

# **Question and Response Booklet**

# **QCE Biology Units 1&2**

# Paper 1

Student's Name: _		
Teacher's Name:		

#### Time allowed

- Perusal time 10 minutes
- Working time 90 minutes

#### **General instructions**

- Answer all questions in this question and response booklet.
- QCAA-approved calculator permitted.
- Planning paper will not be marked.

#### Section 1 (25 marks)

25 multiple choice questions

#### Section 2 (25 marks)

• 7 short response questions

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# **SECTION 1**

#### **Instructions**

- Choose the best answer for Questions 1–25.
- This section has 25 questions and is worth 25 marks.
- Use a 2B pencil to fill in the A, B, C or D answer bubble completely.
- If you change your mind or make a mistake, use an eraser to remove your response and fill in the new answer bubble completely.

	A	В	С	D
Example:				

	A	В	С	D
1.		$\bigcirc$		$\bigcirc$
2.		$\bigcirc$		$\bigcirc$
3.		$\bigcirc$		$\bigcirc$
4.		$\bigcirc$		$\bigcirc$
4. 5.		$\bigcirc$		$\bigcirc$
6. 7.	0	$\bigcirc$	0	$\bigcirc$
7.		$\bigcirc$		$\bigcirc$
8.		$\bigcirc$		$\bigcirc$
9.		$\bigcirc$		$\bigcirc$
10.		$\bigcirc$		$\bigcirc$
11. 12.	0	$\bigcirc$	0	$\bigcirc$
12.		$\bigcirc$		$\bigcirc$
13.		$\bigcirc$		$\bigcirc$
14.		$\bigcirc$		$\bigcirc$
15.		$\bigcirc$		$\bigcirc$
16.	0	$\bigcirc$	$\circ$	$\bigcirc$
17.		$\bigcirc$		$\bigcirc$
18. 19.		$\bigcirc$		$\bigcirc$
19.		$\bigcirc$		$\bigcirc$
20.		$\bigcirc$		$\bigcirc$
21.				
22.	0	$\bigcirc$		$\bigcirc$
23. 24.		$\bigcirc$		$\bigcirc$
24.	0	$\bigcirc$		$\bigcirc$
25.	0	$\bigcirc$		$\bigcirc$

# **SECTION 2**

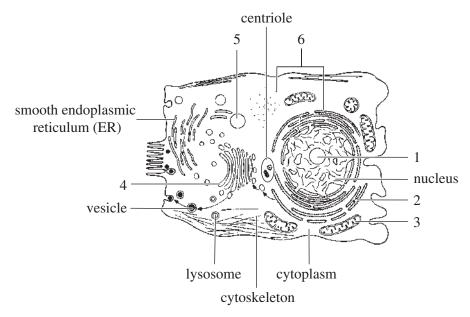
#### **Instructions**

- Write using black or blue pen.
- If you need more space for a response, use the additional pages at the back of this booklet.
  - On the additional pages, write the question number you are responding to.
  - Cancel any incorrect response by ruling a single diagonal line through your work.
  - Write the page number of your alternative/additional response, i.e. See page ...
  - If you do not do this, your original response will be marked.
- This section has seven questions and is worth 25 marks.

QUESTION 26 (3 marks)  Define the term <i>herd immunity</i> and explain how it affects the transmission of an infectious disease.  Refer to one example in your response.			

# QUESTION 27 (4 marks)

The diagram shows a labelled cell.



a) What kind of cell is shown? Circle the correct options below.

[1 mark]

eukaryote / prokaryote

animal cell / plant cell

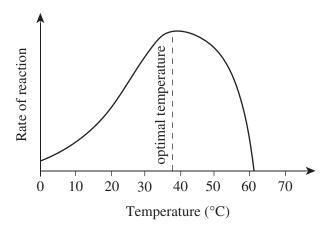
b) Complete the table by identifying the organelles in the cell.

[3 marks]

	Organelle name
1	
2	
3	
4	
5	
6	

# **QUESTION 28** (4 marks)

The diagram shows the rate of reaction for an enzyme taken from an organism.



a) The reaction proceeds very slowly at colder temperatures and then suddenly drops to zero above a certain temperature.

to zero above a certain temperature.	
Explain why this occurs.	[2 marks]

b) The table shows the body temperatures of four organisms.

Organism	<b>Body temperature</b> (°C)
hummingbird	41
blue-tongue lizard	33
human	37
axolotl	16

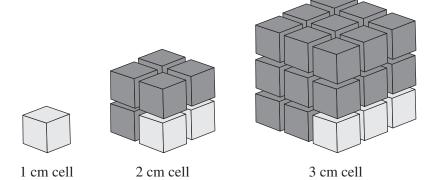
Identify which organism the enzyme was taken from. Justify your response with reference to the data provided.		

QUESTION 29 (2 marks) Using the lock-and-key model, describe the structure and role of the active site of an enzyme.
QUESTION 30 (2 marks)  A sample is taken from an infected wound and smeared evenly across a nutrient medium. Antibiotics of four different types (A, B, C and D) are then placed upon the medium. The sample is allowed to culture overnight and bacterial colonies grow across the majority of the medium. The diagram shows the resulting zones of inhibition.
B C D zone of inhibition bacterial colony
Based on the data, justify which antibiotic should be prescribed for the patient.

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# QUESTION 31 (5 marks)

The diagram models three different sizes of a cell.



The surface area and volume of each cell model is shown.

1 cm cell	
Surface area	6 cm <sup>2</sup>
Volume	1 cm <sup>3</sup>

a)

2 cm cell	
Surface area	24 cm <sup>2</sup>
Volume	8 cm <sup>3</sup>

Calculate the surface area to volume ratio for the cell models above.

3 cm cell	
Surface area	64 cm <sup>2</sup>
Volume	27 cm <sup>3</sup>

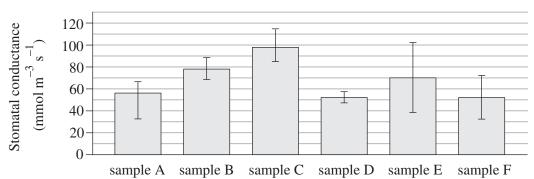
[3 marks]

Identify and	explain which cell model would maximise gas exchange with the surrounding	,
environment.		[2 mc
CIIVII OIIIIICIIL.		
CHVIIOIIIICII.		

# QUESTION 32 (5 marks)

a) Describe the role of guard cells in controlling the movement of carbon dioxide (CO<sub>2</sub>), oxygen (O<sub>2</sub>) and water vapour (H<sub>2</sub>O). In your response, suggest how this function is a 'trade-off'. [3 marks]

b) Stomatal conductance is the rate of passage of carbon dioxide entering or water vapour exiting through the stomata of a leaf. The graph shows the stomatal conductance of samples taken from six different plant species.



Explain which sample is likely taken from a rainforest plant.

[2 marks]

#### **END OF PAPER**

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ADDITIONAL PAGE FOR STUDENT RESPONSES  Write the question number you are responding to.					
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#### **REFERENCES**

#### **QUESTION 31**

Adapted from Christinelmiller (2020). Accessed November 2021. https://commons.wikimedia.org/wiki/File:Unit\_cell\_for\_SA\_to\_V\_ratio\_with\_tables.png. Licensed under CC BY 4.0 International, https://creativecommons.org/licenses/by-sa/4.0/deed.en.

#### **QUESTION 32**

Adapted from Jolly AR, Zailaa J, Farah U, Woojuh J, et al. (2021). *Leaf Venation and Morphology Help Explain Physiological Variation in Yucca brevifolia and Hesperoyucca whipplei Across Microhabitats in the Mojave Desert, CA*. Front. Plant Sci. 11:578338. doi: 10.3389/fpls.2020.578338. Accessed November 2021. https://www.frontiersin.org/articles/10.3389/fpls.2020.578338/full. Licensed under CC BY 4.0 International, https://creativecommons.org/licenses/by-sa/4.0/deed.en.