

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

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 | B | C | D |
| Example: | <input checked="" type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |

| | A | B | C | D |
|------------|-----------------------|-----------------------|-----------------------|-----------------------|
| 1. | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 2. | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 3. | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 4. | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 5. | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 6. | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 7. | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 8. | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 9. | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 10. | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 11. | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 12. | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 13. | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 14. | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 15. | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 16. | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 17. | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 18. | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 19. | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 20. | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 21. | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 22. | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 23. | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 24. | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 25. | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |

SECTION 2

Instructions

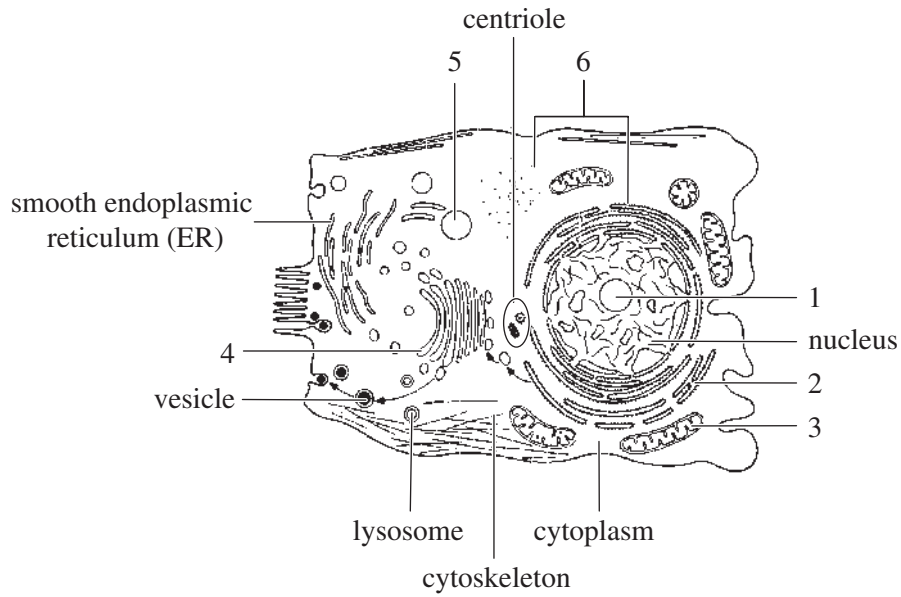
- Write using black or blue pen.
 - If you need more space for a response, use the additional pages at the back of this booklet.
 - On the additional pages, write the question number you are responding to.
 - Cancel any incorrect response by ruling a single diagonal line through your work.
 - Write the 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.
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QUESTION 26 (3 marks)

Define the term *herd immunity* 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]

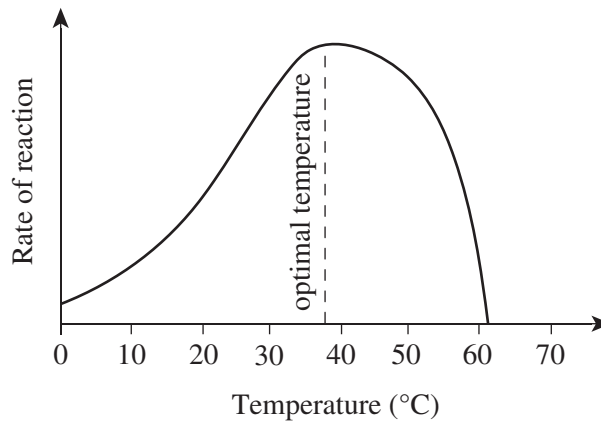
eukaryote / prokaryote animal cell / plant cell

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.

Explain why this occurs.

[2 marks]

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

| Organism | Body temperature (°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.

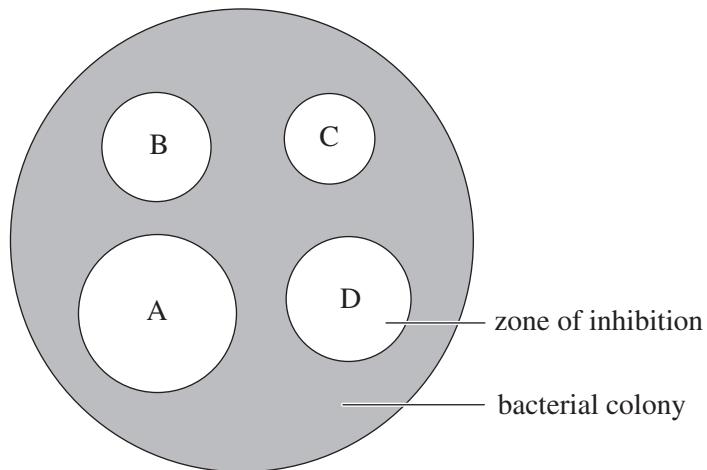
[2 marks]

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.



Based on the data, justify which antibiotic should be prescribed for the patient.

REFERENCES

QUESTION 31

Adapted from Christinellmiller (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>.