

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)

- 5 short response questions

SECTION 1

Instructions

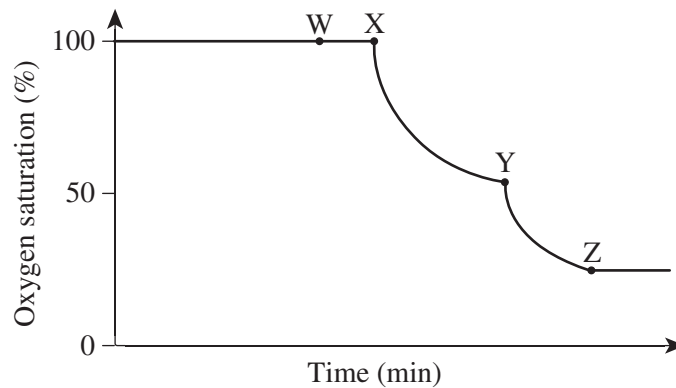
- Choose the best answer for Questions 1–25.
- This section has 25 questions and is worth 25 marks.
- Use a 2B pencil to fill in the A, B, C or D answer bubble completely.
- If you change your mind or make a mistake, use an eraser to remove your response and fill in the new answer bubble completely.

	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"/>
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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"/>

QUESTION 27 (5 marks)

The following graph shows the results of an experiment in which mitochondria were extracted from muscle cells and placed in a fluid. The oxygen levels were measured in the fluid over time. At point W on the graph, pyruvate was added to the fluid. At points X, Y and Z, ADP and P_i were added.



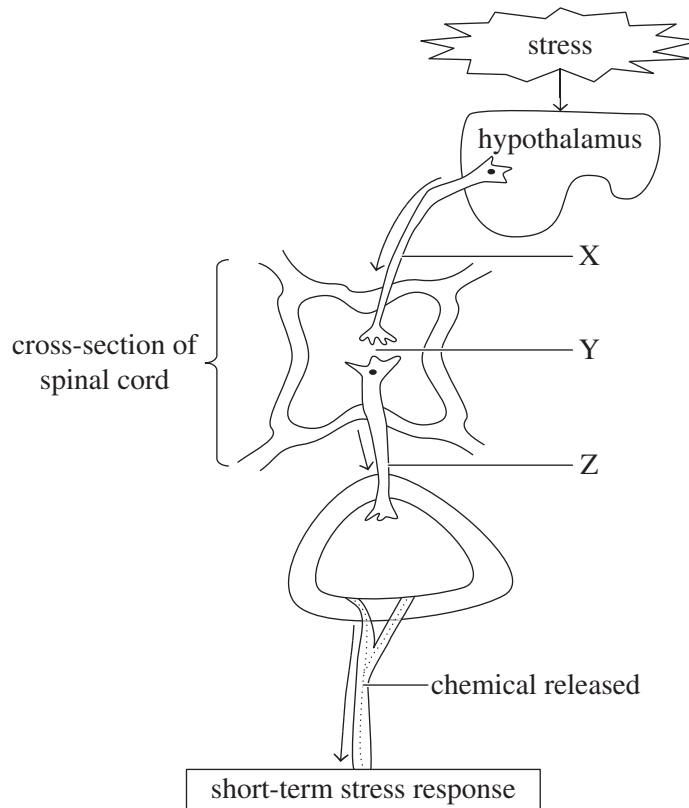
- a) Explain why oxygen consumption by the mitochondria could not begin until pyruvate was added. *[2 marks]*

- b) The stage of the process that occurs between points X and Z on the graph causes a marked reduction in oxygen saturation. Identify the stage of this process and write an equation in words or symbols that indicates the inputs and outputs, including ADP and P_i . *[2 marks]*

- c) Why did oxygen consumption not continue after ADP and P_i were added at point Z? *[1 mark]*

QUESTION 28 (5 marks)

In a response to a stressful stimulus, the hypothalamus sends two types of messages that trigger the release of two different hormones from two different areas in the adrenal gland. One of these processes is shown in the following diagram.



- a) Identify the areas labelled Y and Z. [2 marks]

Y: _____

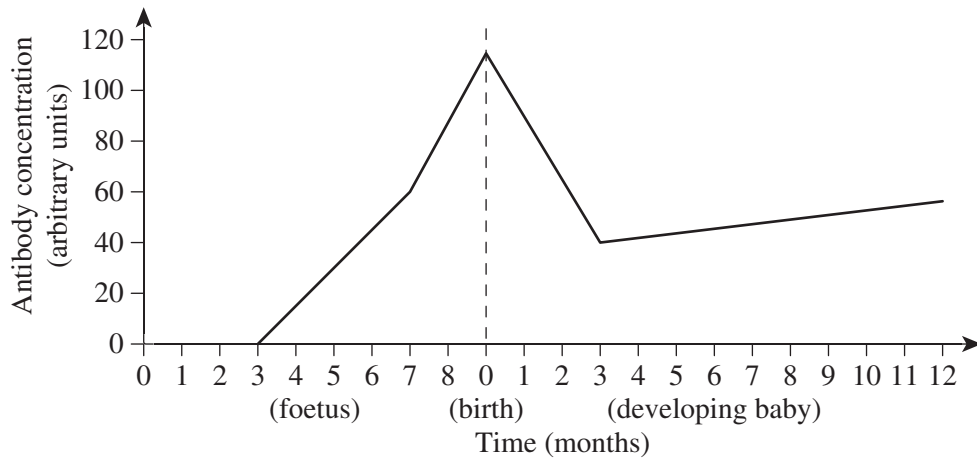
Z: _____

- b) Use appropriate terminology to compare the process of transmission in area Z and the process in area Y. [2 marks]

- c) The adrenal gland releases a hormone into the blood. What is one distinctive feature of this type of gland? [1 mark]

QUESTION 29 (6 marks)

The following graph shows the antibody concentration in a foetus during the nine months of development before birth, at birth, and in the developing baby up to twelve-months old.



- a) Explain the difference in changes in antibody concentration in the three months before birth and the three months after birth. *[2 marks]*

- b) Outline two reasons for the increase in antibody concentration from three-months old to twelve-months old. *[2 marks]*

- c) As a person ages, their thymus gland begins to shrink.
Explain why this would affect their antibody concentration level. *[2 marks]*

QUESTION 30 (5 marks)

In America, the most widespread pest-carried disease is Lyme disease. Recently, it has been reported in Australia but there is some debate as to whether it is present. Lyme disease is caused by the bacterium *Borrelia burgdorferi*, which is carried by a specific type of tick that lives on deer and field mice. The first symptoms are a raised red rash that appears in a circle, fatigue, joint stiffness, headache and 'swollen glands'.

- a) Identify and describe the cause of the raised red rash. [2 marks]

- b) Lyme disease can be diagnosed by testing blood for the specific antibodies. Both the humoral and cell-mediated components of the adaptive immune system can act against bacterial antigens such as the bacteria causing Lyme disease. However, the cells and mechanism involved in each component are different.

For each of the humoral and cell-mediated components, name the major cell type involved and describe the mechanism used to destroy the bacteria. [2 marks]

Humoral component: _____

Cell-mediated component: _____

- c) A vaccine for Lyme disease was being used up until 2002, but it was unsuccessful. No current vaccine is available.

Outline a measure that could be taken to stop the spread of Lyme disease both locally and globally. [1 mark]

END OF PAPER

