



The external assessment requirements of this subject are listed on page 14.

# Biology

## November 2018 sample paper

### Question Booklet 2

- Part B of Section 2 (Questions 22 to 29) 52 marks
- Answer *all* questions in Part B
- Write your answers in this question booklet
- You may write on page 13 if you need more space
- Allow approximately 50 minutes

SAMPLE

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Copy the information from your SACE label here

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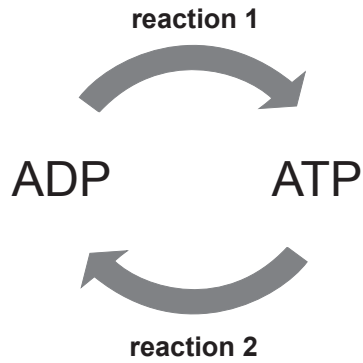
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**SECTION 2: Part B** (Questions 22 to 29)  
(52 marks)

Answer **all** questions in the spaces provided.

22. Refer to the following diagram:



- (a) (i) Name a cellular process that provides energy for **reaction 1**, and describe the role that this energy has in **reaction 1**.

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\_\_\_\_\_ (3 marks)

- (ii) Describe **reaction 2** and explain its importance to cells.

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\_\_\_\_\_ (3 marks)

- (b) State the type of energy lost at each step of a metabolic pathway.

\_\_\_\_\_ (1 mark)

23. After vigorous exercise an individual often hyperventilates. Hyperventilation causes an increase in the pH of blood.

(a) State *one* reason why it is important to maintain the pH of blood.

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(1 mark)

(b) Explain how hyperventilation causes an increase in the pH of blood.

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(3 marks)

(c) Describe how receptors in the brain detect an increase in the pH of blood.

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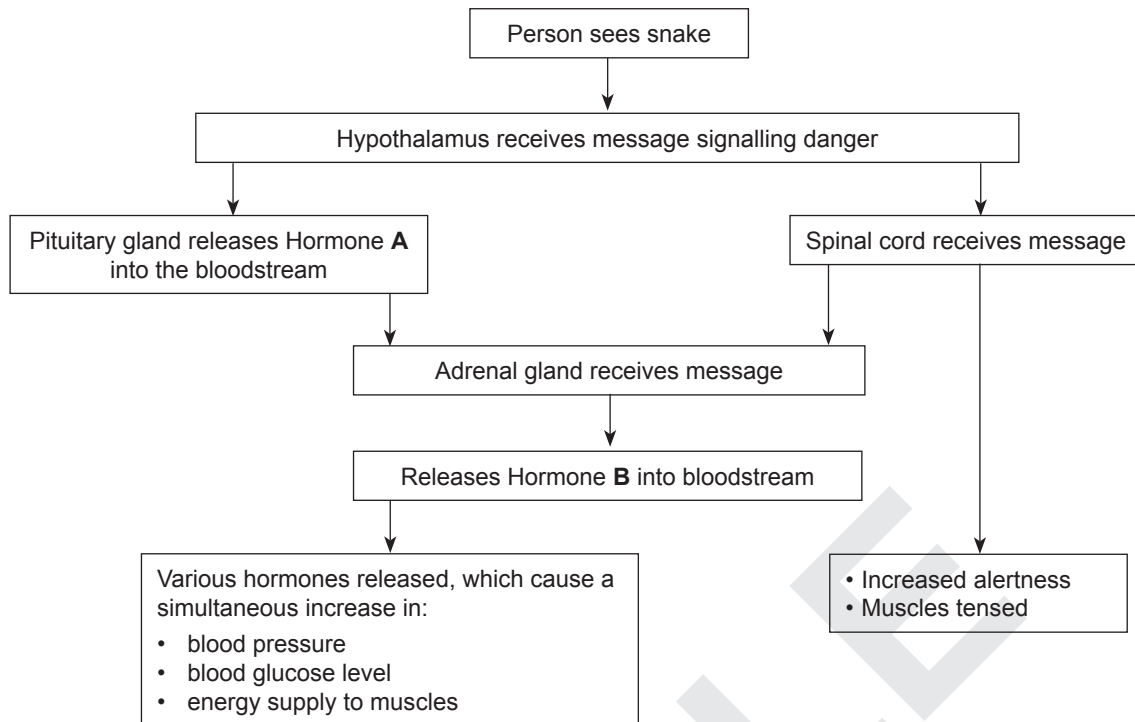
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(3 marks)

24. Refer to the flow chart below, which represents the 'fight or flight' response in a person who has seen a snake while walking in bushland:



(a) Identify Hormone B.

\_\_\_\_\_ (1 mark)

(b) Draw and label the main structural features of a neuron that would send a message to the hypothalamus after the snake was observed.

(3 marks)

- (c) Compare the actions of the nervous system and the actions of the endocrine system in the 'fight or flight' response.

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(3 marks)

- (d) Using the flow chart on page 4, explain why a person who has diabetes may experience a medical emergency as a result of the 'fight or flight' response.

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(3 marks)

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25. Evidence suggests that all mammals share a common ancestor. Two features that are common to all mammals are hair and mammary glands.

The most primitive group of mammals, known as the monotremes, lay eggs.

Other mammals give birth to live young. These mammals can be further classified as either marsupials or eutherians. All mammals in these two groups possess a placenta. Eutherians evolved as a distinct group from marsupial mammals, and gave rise to the majority of mammals on Earth today.

Using the information provided, construct a phylogenetic tree diagram to show the evolution of the three groups of mammals — monotremes, marsupials, and eutherians — from a common ancestor.

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(2 marks)

26. Some estimates suggest that fewer than 10 000 Sumatran orang-utan (*Pongo abelii*) are currently living in Indonesian tropical rainforests. It is estimated that up to 1000 Sumatran orang-utan are dying each year as a direct result of the actions of humans.



Source: Tayfun Sertan Yaman | Dreamstime.com

- (a) Identify *two* examples of human activities that lead to environmental changes that damage the rainforests of Indonesia.

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(2 marks)

- (b) Describe how *one* of the activities that you identified in part (a) may threaten the survival of or cause the extinction of the Sumatran orang-utan.

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(2 marks)

27. The Mallee Emu-wren (*Stipiturus mallee*) is an endangered species of small bird living in semi-arid shrublands in south-eastern Australia. Bushfires occur frequently in this area and may have reduced the population of this species. The results of a recent study suggest that this reduced population may have caused genetic drift.



Source: © Ron Knight, Seaford, East Sussex, UK, Creative Commons Attribution 2.0 Generic [license](https://commons.wikimedia.org/wiki/File:Mallee_Emuwren_Stipiturus_mallee_(8079650268).jpg)  
[https://commons.wikimedia.org/wiki/File:Mallee\\_Emuwren\\_Stipiturus\\_mallee\\_\(8079650268\).jpg](https://commons.wikimedia.org/wiki/File:Mallee_Emuwren_Stipiturus_mallee_(8079650268).jpg)

Refer to the following map, which shows (in red) the distribution of the Mallee Emu-wren:



- (a) Describe how a change in the gene pool of the Mallee Emu-wren may result in genetic drift.

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(2 marks)

- (b) State *one* possible consequence of genetic drift for the Mallee Emu-wren population.

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(1 mark)



28. A group of students conducted a series of investigations to determine the effects of different factors on the rate of an enzyme-catalysed reaction in human cells. The enzyme has an optimum temperature of 37°C.

(a) One investigation was carried out to determine the effect of pH on this enzyme-catalysed reaction.

(i) State *one* hypothesis for this investigation.

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\_\_\_\_\_ (2 marks)

(ii) Explain the importance of identifying sources of uncertainty, and suggest how one of these sources may have affected the results of this investigation.

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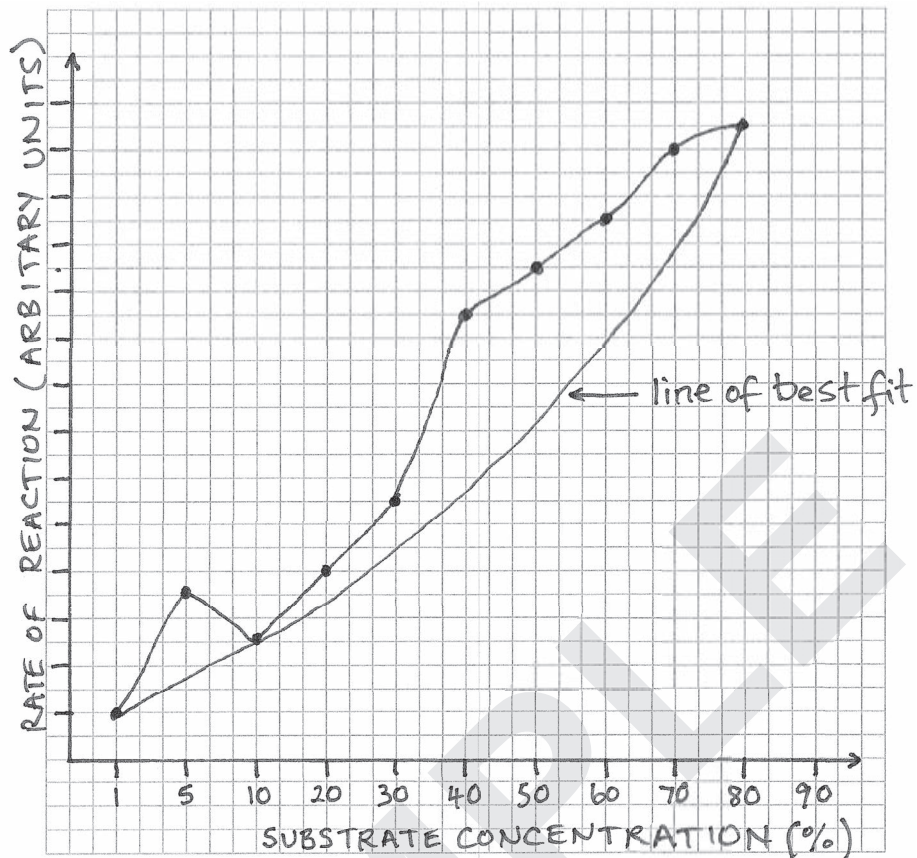
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\_\_\_\_\_ (3 marks)

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- (b) A second investigation was carried out to determine the effect of substrate concentration on the rate of the enzyme-catalysed reaction.

The students represented their results as shown in the graph below.



- (i) State the independent variable in this investigation.

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\_\_\_\_\_ (1 mark)

- (ii) Identify *two* errors in the way in which the students have represented their results.

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\_\_\_\_\_ (2 marks)

- (iii) State *one* factor that may not have been able to be controlled, and describe how this could affect the data obtained.

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(2 marks)

- (iv) State *one* limitation of any conclusion drawn from this second investigation.

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(1 mark)

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## **NOVEMBER 2018 SAMPLE BIOLOGY PAPER**

The purpose of this sample paper is to show the structure of the Biology examination and the style of questions that may be used. The following extract is from the 2018 subject outline for Biology:

### **EXTERNAL ASSESSMENT**

#### **Assessment Type 3: Examination (30%)**

Students undertake one 2-hour examination.

Stage 2 science inquiry skills and science understanding from all topics may be assessed.

Questions:

- will be of different types
- may require students to show an understanding of science as a human endeavour
- may require students to apply their science understanding from more than one topic.

All specific features of the assessment design criteria for this subject may be assessed in the external examination.

*Source: Biology 2018 Subject Outline Stage 2, p 39, on the SACE website, [www.sace.sa.edu.au](http://www.sace.sa.edu.au)*

SAMPLE



