

Centre Number	Candidate Number	Candidate Name
---------------	------------------	----------------

NAMIBIA SENIOR SECONDARY CERTIFICATE

BIOLOGY ORDINARY LEVEL

4322/2

PAPER 2

2 hours

Marks 100

2018

Additional Materials: Ruler

INSTRUCTIONS AND INFORMATION TO CANDIDATES

- Candidates answer on the Question Paper in the spaces provided.
- Write your Centre Number, Candidate Number and Name in the spaces at the top of this page.
- Write in dark blue or black pen.
- You may use a soft pencil for any diagrams, graphs or rough working.
- Do not use correction fluid.
- You may use a non-programmable calculator.
- Do not write in the margin *For Examiner's Use*.
- Answer **all** questions.
- The number of marks is given in brackets [] at the end of each question or part question.

For Examiner's Use	
1	
2	
3	
4	
5	
6	
7	
8	
Total	
<i>Marker</i>	
<i>Checker</i>	

This document consists of **17** printed pages and **3** blank pages.



Republic of Namibia
MINISTRY OF EDUCATION, ARTS AND CULTURE

1 Below is a list of hierarchical groups used in the classification of living organisms.

class family genus kingdom order species

(a) (i) Identify the name of the group that consists of organisms which can interbreed to produce fertile offspring.

..... [1]

(ii) Outline **two** uses of a classification system.

1

.....

2

..... [2]

(b) Fig. 1.1 shows a ground squirrel found in the Etosha National Park in Namibia.

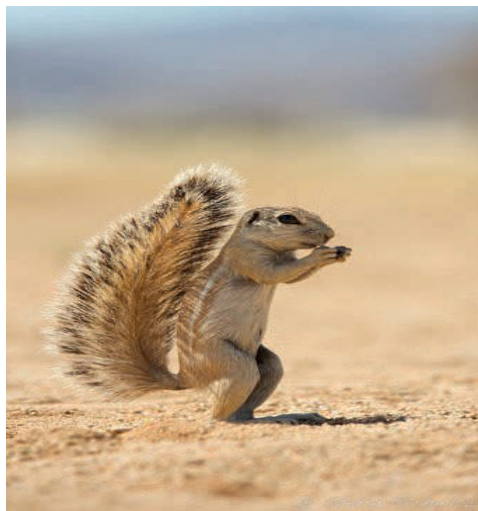


Fig. 1.1

(i) Complete Table 1.1 to show the classification of the ground squirrel.

Table 1.1

Kingdom
.....	Mammalia
Family	Sciuridae
Genus	<i>Xerus</i>
Species	<i>inauris</i>

[2]

(ii) What is the binomial name of the ground squirrel?
..... [1]

(iii) List **two** diagnostic features of the group the ground squirrel belongs to.
1
2 [2]

(c) (i) Classify ground squirrels as either endothermic or ectothermic.
..... [1]

(ii) Give a reason to explain your answer in (c) (i).
.....
..... [1]

(iii) Fig. 1.2 shows a behavioural pattern characteristic of ground squirrels.



Fig. 1.2

Using Fig. 1.2, identify a feature or behavioural adaptation and explain its significance in the survival of the ground squirrel.

Feature or behavioural adaptation
Significance in survival.....
..... [2]

(d) Suggest a reason why the conservation of animals such as ground squirrels is important.
.....
..... [1]

[13]

2 Fig. 2.1 shows an enzyme controlled reaction at 37°C.

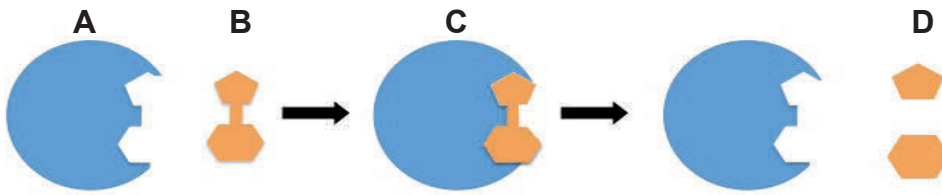


Fig. 2.1

(a) Define the term *enzyme*.

.....

.....

.....

.....

[2]

(b) Identify the components labelled **B** and **D**.

B

D

[2]

(c) Describe and explain what happens to **A** and the effect that this has on the reaction shown in Fig. 2.1 when the human body temperature rises above 40°C.

.....

.....

.....

.....

.....

.....

.....

[3]

(d) Seeds contain stored food reserves. With reference to **named enzymes** in seeds, describe the role they play in germination.

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

[4]

[11]

BLANK PAGE

PLEASE TURN OVER FOR QUESTION 3

3 Water and carbon dioxide are raw materials needed for photosynthesis.

(a) (i) Give the balanced symbol equation for the production of glucose and oxygen.

..... [2]

(ii) Name the structures found in palisade cells where photosynthesis takes place.

..... [1]

(iii) Describe the process by which plants take up water through their roots.

.....
.....
.....
.....
.....
.....
..... [3]

(b) Photosynthesis produces a large amount of glucose. Some of this glucose is used up and some is stored in the roots.

(i) Describe how glucose made in the leaves ends up in the roots.

.....
.....
.....
.....
.....
.....
.....
.....
..... [4]

(ii) Apart from the roots and seeds, where else can carbohydrates be stored in plants?

..... [1]

(c) Nitrate ions and magnesium ions are important for healthy plant growth. Fig. 3.1 shows nutrient deficiencies in two leaves.



Fig. 3.1

(i) Nitrate ion deficiency can result in stunted growth. Ignoring reference to the size of the leaves in Fig. 3.1, identify the leaf that shows a deficiency of nitrate ions.

..... [1]

(ii) Give a reason to support your answer in (c) (i).

.....
..... [1]

[13]

- 4 Fig. 4.1 shows an incomplete diagram of a vein transporting blood to the heart in longitudinal section.

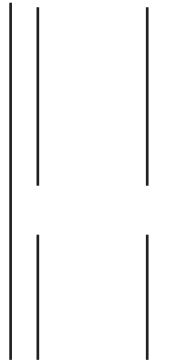


Fig. 4.1

- (a) (i) Complete Fig. 4.1 by drawing onto the diagram the valves. Show the direction of blood flow through the vein using an arrow. [2]

- (ii) Describe the functions of the veins in the body and explain how the valves ensure that the blood travels through them in one direction only.

Description

.....

Explanation

.....

..... [2]

- (b) Blood vessels transport blood around the body.

Table 4.1 shows some features of what the blood transports around the body. Complete Table 4.1.

Table 4.1

what is transported	carried from	carried to
amino acid	small intestines	(i)
heat	(ii) (iii)	skin
hormones	endocrine gland	(iv)

[4]

(c) Blood clotting is an important process that prevents excessive bleeding when a blood vessel is damaged.

(i) State the component of blood and the plasma protein involved in blood clotting.

Blood component

Plasma protein [2]

(ii) Describe the sequence of events involved in blood clotting.

.....
.....
.....
.....
.....
.....
.....
.....
.....
.....

[4]

[14]

5 Fig. 5.1 shows the breathing rates for two students before and after exercise.

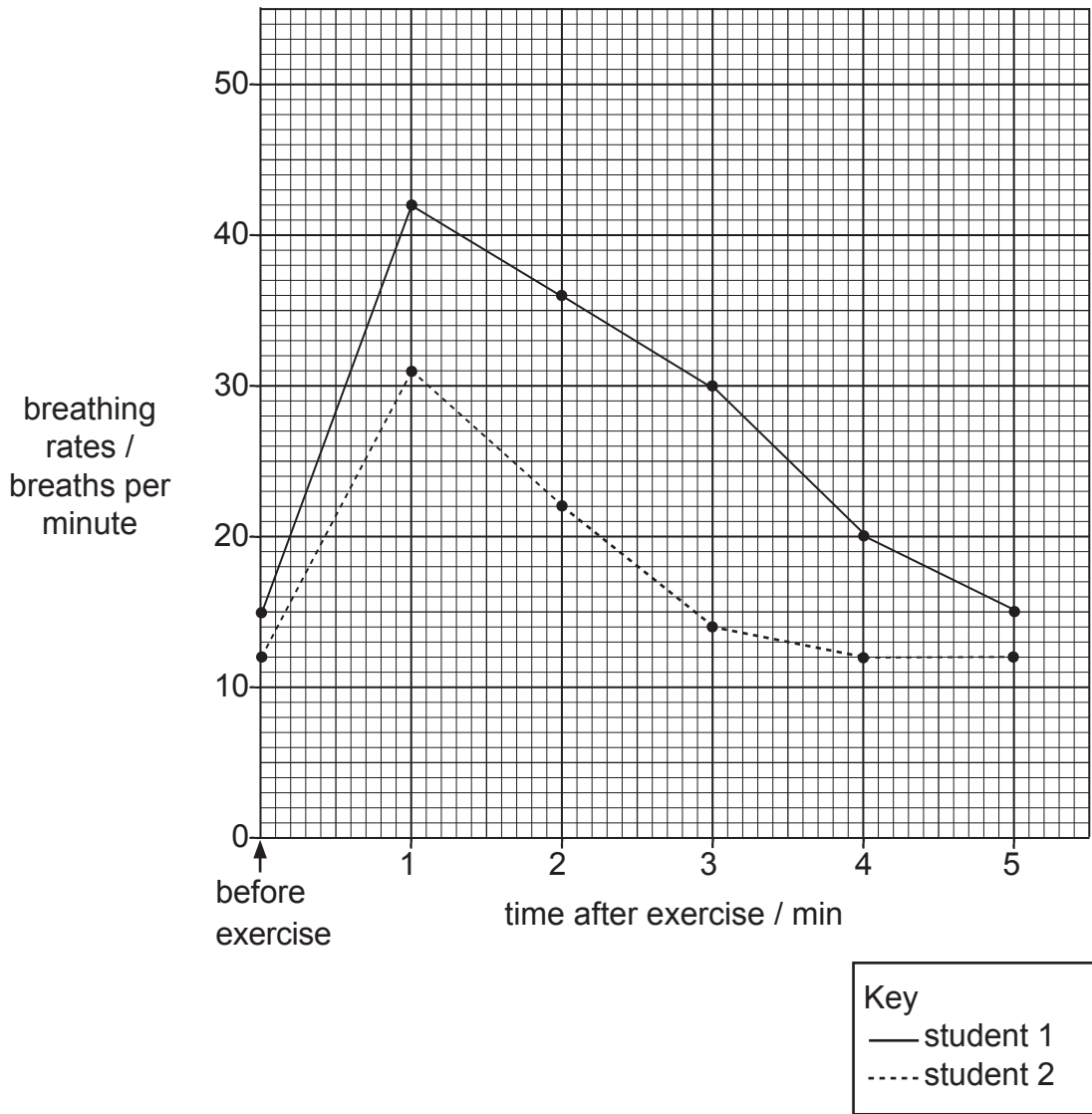


Fig. 5.1

(a) (i) Distinguish between breathing and gaseous exchange.

.....
.....
.....
.....

[2]

(ii) Explain why exercise causes an increase in the breathing rate.

.....
.....
.....
.....

[2]

- (iii) Using Fig. 5.1, state which student recovered more quickly after exercise and explain the reason for your answer.

Student

Explanation

.....
.....

[2]

- (b) Fig. 5.2 shows the effect of exercise on the concentration of oxygen in the blood and the concentration of lactic acid in the muscles of a healthy person over a period of 6 minutes.

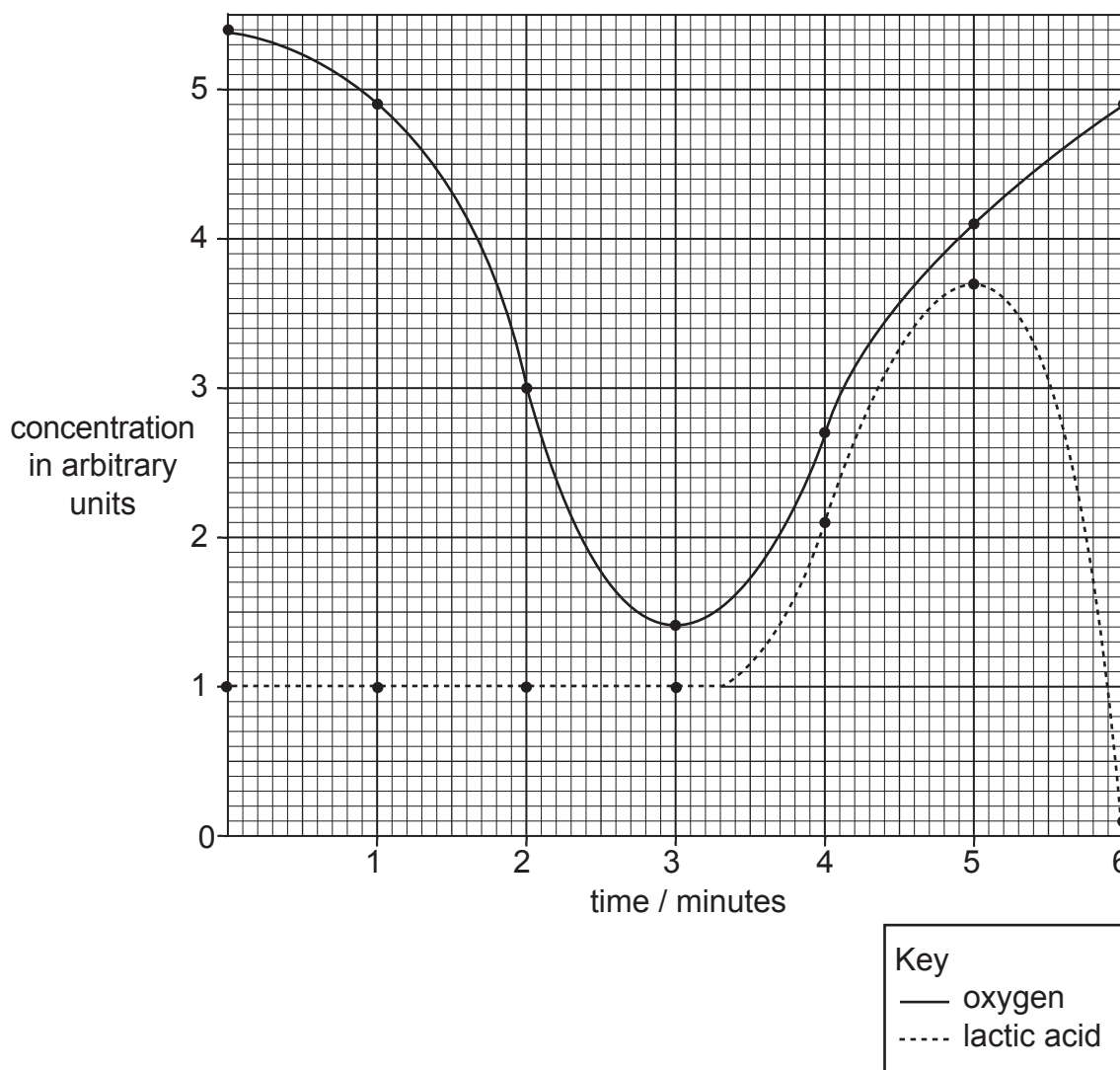


Fig. 5.2

- (i) Respiration releases energy that can be used during exercise.

Use Fig. 5.2 to state which type of respiration is taking place between the 3rd and the 5th minute.

.....

[1]

(ii) Explain why the lactic acid concentration increased in the muscles after the 3rd minute of exercise.

.....
.....
.....
.....
.....
.....

[3]

(c) Describe how anaerobic respiration is used by the brewing industry.

.....
.....
.....
.....
.....
.....

[3]

[13]

BLANK PAGE

PLEASE TURN OVER FOR QUESTION 6

- 6 Blood samples from the renal artery and urine from the bladder were taken from two men **A** and **B**. Table 6.1 shows the urea concentration and glucose concentration of the samples.

Table 6.1

	man A		man B	
	blood (plasma)	urine	blood (plasma)	urine
urea mg/cm ³	2.01	1.98	1.60	0.05
glucose mg/cm ³	1.00	0.00	0.90	0.89

- (a) (i) Name the organ in the human body which produces urea.
 [1]
- (ii) Describe how urea is formed.

 [2]
- (iii) Use Table 6.1 to identify which of the two men is likely to be suffering from a kidney problem and explain your answer.
 Man
 Explanation
 [2]
- (iv) Describe **one** function of the kidney, other than removal of urea.

 [1]

(b) People with kidney disease may have to use a kidney machine. These operate by dialysis.

Explain how a kidney machine works.

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

[4]

(c) Describe and explain the changes that would be seen in the composition of the blood plasma if man **A**'s liver becomes damaged.

.....

.....

.....

.....

[2]

[12]

7 Fig. 7.1 shows structures found in the nucleus of a cell.

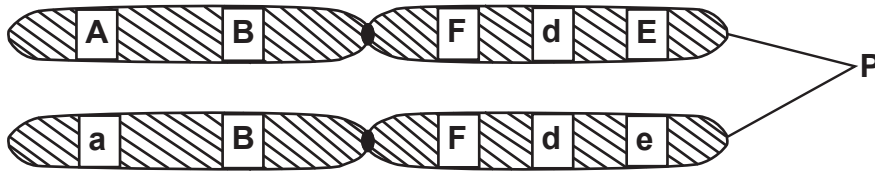


Fig. 7.1

(a) (i) Name structure P.

..... [1]

(ii) State the name of the hereditary material contained in structure P.

..... [1]

(b) Use information from Fig. 7.1 and the list of points below to complete Table 7.1.

Each point can be used more than once and not all points are useful.

- alleles
- a pair of alleles that are recessive
- phenotype of a parent
- genes
- diploid and haploid nuclei

Table 7.1

(i)	a pair of alleles that are homozygous dominant
A; B; a; B; e; E; d; F;	(ii)
dd	(iii)
E or e	(iv)

[4]

(c) Fig. 7.2 represents different types of variation in living organisms.

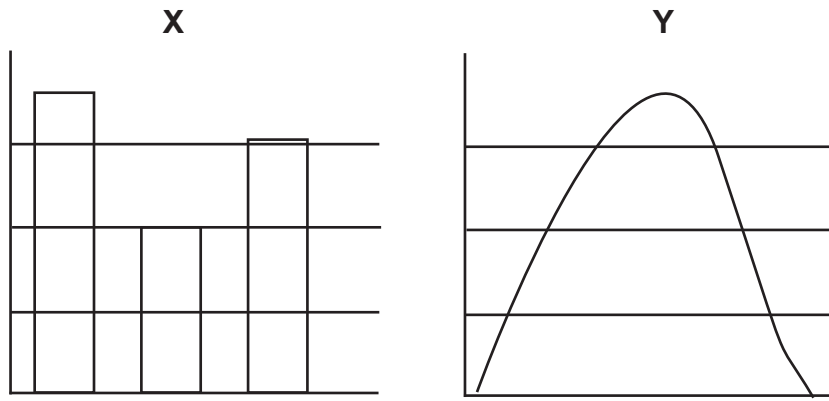


Fig. 7.2

(i) Name **one** characteristic that could be represented on **X** and **Y**.

X.....

Y.....

[2]

(ii) Which graph represents discontinuous variation?

.....

[1]

(d) Antibiotic resistant bacteria have developed by natural selection. Describe the mechanism by which this has happened.

.....

.....

.....

.....

.....

.....

.....

.....

.....

[4]

[13]

8 Fig. 8.1 shows a cause of acid rain.

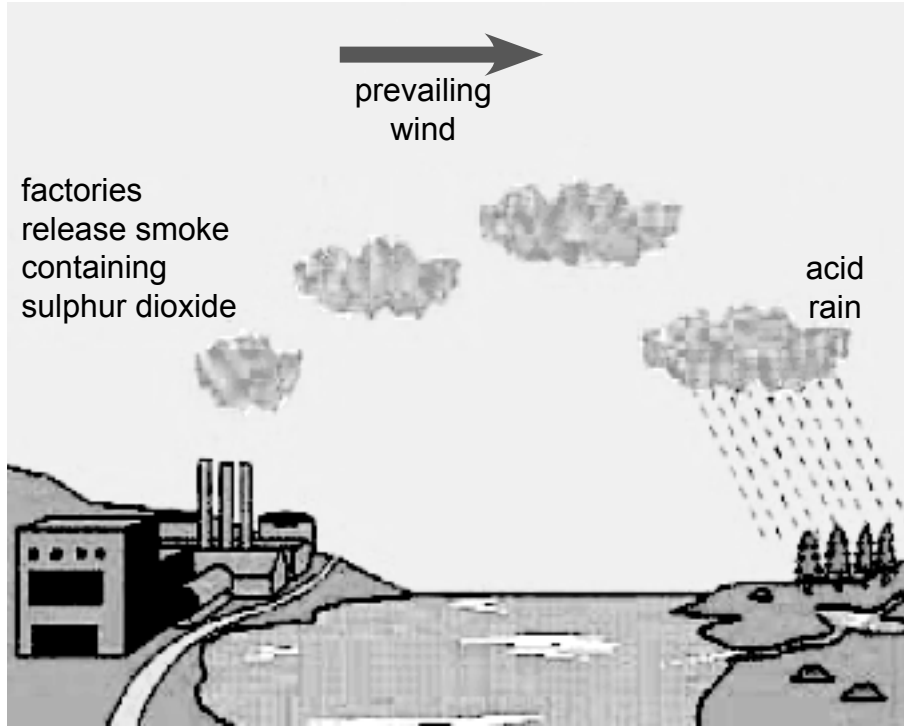


Fig. 8.1

(a) (i) State **two** causes of acid rain **other** than those shown in Fig. 8.1.

- 1
- 2

[2]

(ii) Discuss **two** effects of acid rain on aquatic life.

- 1
-
- 2
-

[2]

(b) Acid rain indirectly affects plant growth and vegetation. This can lead to fewer trees in the environment, and is further worsened by humans removing trees and using them as fuel.

Describe **two** undesirable effects of deforestation.

- 1
-
- 2
-

[2]

(c) Fig. 8.2 shows pollution of water in a river by sewage.

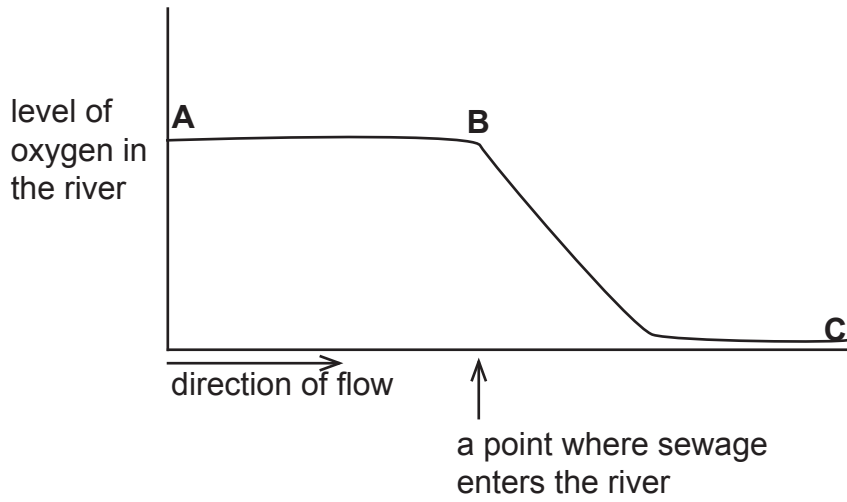


Fig. 8.2

(i) State the effect of sewage on the river shown in Fig. 8.2.

.....
.....

[1]

(ii) Discuss the process that leads to a change in the oxygen level between points B and C.

.....
.....
.....
.....
.....
.....
.....
.....
.....
.....

[4]

[11]

BLANK PAGE