Centre Number	Candidate Number	Candidate Name

NAMIBIA SENIOR SECONDARY CERTIFICATE

BIOLOGY ORDINARY LEVEL

6116/2

PAPER 2

1 hour 30 minutes

Marks 80

2022

Additional Material: Non-programmable calculator

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	
Total	

Marker	
Checker	

ORDINARY LEVEL

This document consists of **16** printed pages.

Republic of Namibia

MINISTRY OF EDUCATION, ARTS AND CULTURE

For Examiner's Use

1 Butterfly fish are a group of more than 110 species found in the tropical reefs. They belong to the genus *Chaetodon*. It is believed that some species of Chaetodon are under threat of extinction.

Fig. 1.1 shows four species of butterfly fish.

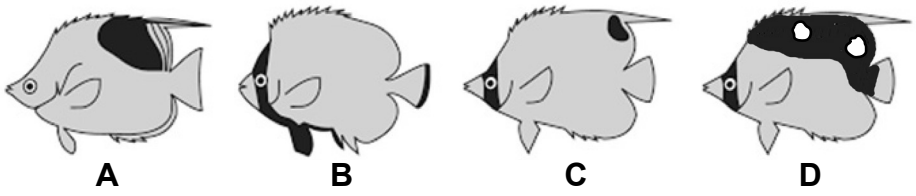

Fig. 1.1

Fig. 1.2 shows the details of body parts of the butterfly fish for easy identification.

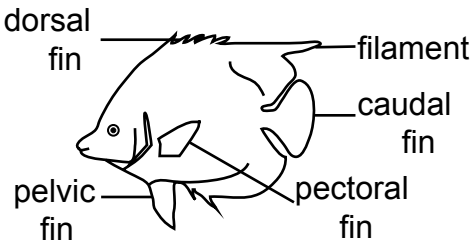

Fig. 1.2

(a) Use the dichotomous key below to identify each fish in Fig.1.1 and write your answers in Table 1.1.

1	pelvic fin shaded	*C. kleinii*
	pelvic fin not shaded	2
2	one dark spot below dorsal fin	3
	two white spots below dorsal fin	*C. quadrimaculatus*
3	shaded area on the head across the eye	*C. auringa*
	no shaded area on the head	*C. ophippium*

Table 1.1

Letter	Species name
A	.....
B	.....
C	.....
D	.....

[4]

For Examiner's Use

(b) With reference to *Chaetodon quadrimaculatus* describe the binomial system of naming species.

.....

.....

.....

..... [2]

(c) List **two** main features of fish which distinguish them from mammals.

1 .....

.....

2 .....

..... [2]

(d) **(i)** What is meant by the term *extinction*?

.....

.....

..... [1]

(ii) Suggest **two** ways how the extinction of some species of Chaetodon may be prevented through conservation.

1 .....

.....

2 .....

..... [2]

[11]

For Examiner's Use

2 Fig. 2.1 shows a villus from the small intestine of a mammal.

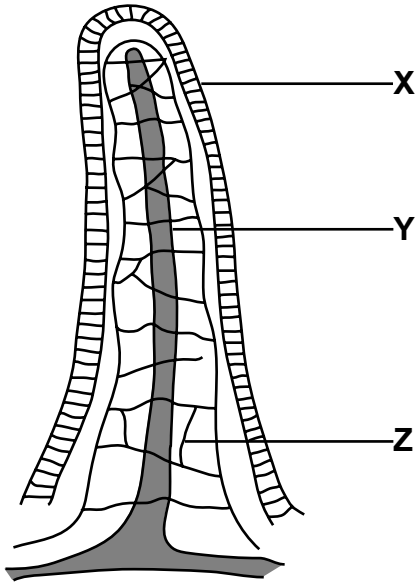

Fig. 2.1

(a) Name the structures **X**, **Y** and **Z** in Fig. 2.1.

X.....

Y.....

Z..... [3]

(b) State the function of **Y**.

.....

..... [1]

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(c) Fig 2.2 shows part of the human digestive system.

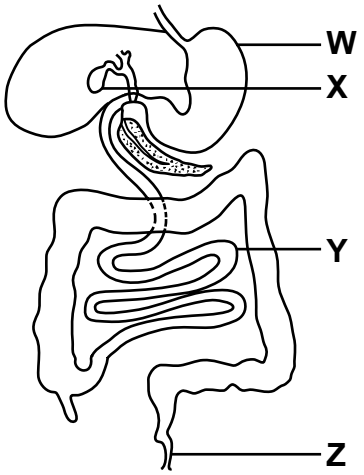

Fig. 2.2

(i) Use the letter from Fig. 2.2 to identify which structure carries out the given function. Write your answers in Table 2.1.

Table 2.1

function	letter
absorption	
bile storage	
egestion	
protein digestion	

[4]

(ii) The stomach cells secrete hydrochloric acid.
State the function of hydrochloric acid in digestion.

.....

.....

.....

..... [2]

[10]

For Examiner's Use

3 Fig. 3.1 shows a lily flower. The lily is an insect-pollinated plant.

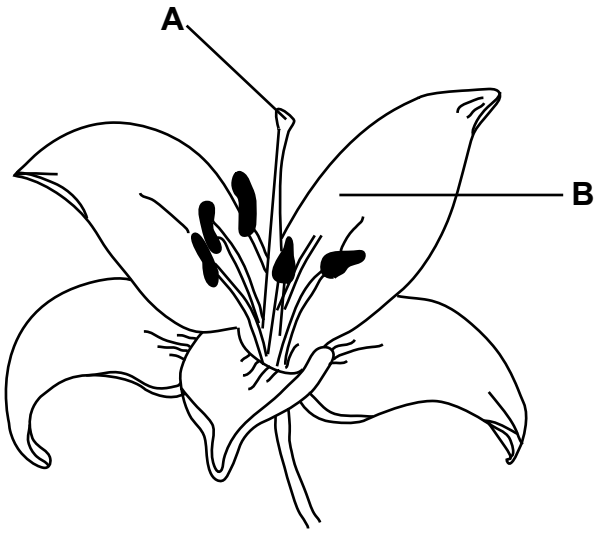

Fig. 3.1

(a) (i) Identify the parts labelled **A** and **B** in Fig. 3.1.

A .....

B ..... [2]

(ii) Describe **two** observable features in Fig. 3.1 which shows that the lily flower is adapted for insect-pollination.

.....

.....

.....

..... [2]

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(b) Fig. 3.2 shows a wind-pollinated flower.

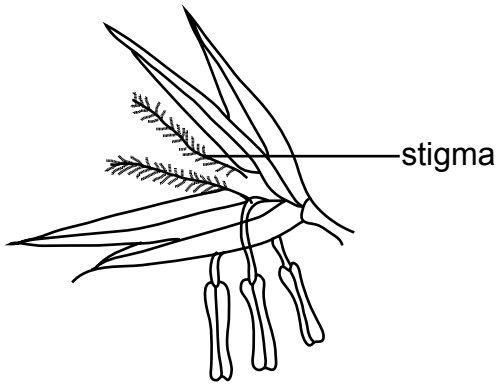

Fig. 3.2

(i) Describe the sequence of events that take place in flowers after pollination leading to fertilisation.

.....

.....

.....

.....

.....

.....

.....

..... [4]

(ii) State the function and adaptation of the stigmas in Fig.3.2 to their role in wind-pollination.

function.....

.....

adaptation .....

..... [2]

(iii) Explain the importance of seed dispersal to a species of plants.

.....

.....

.....

..... [2]

[12]

For Examiner's Use

4 Fig. 4.1 shows parts of the human circulatory system and some of the organs supplied by this system.

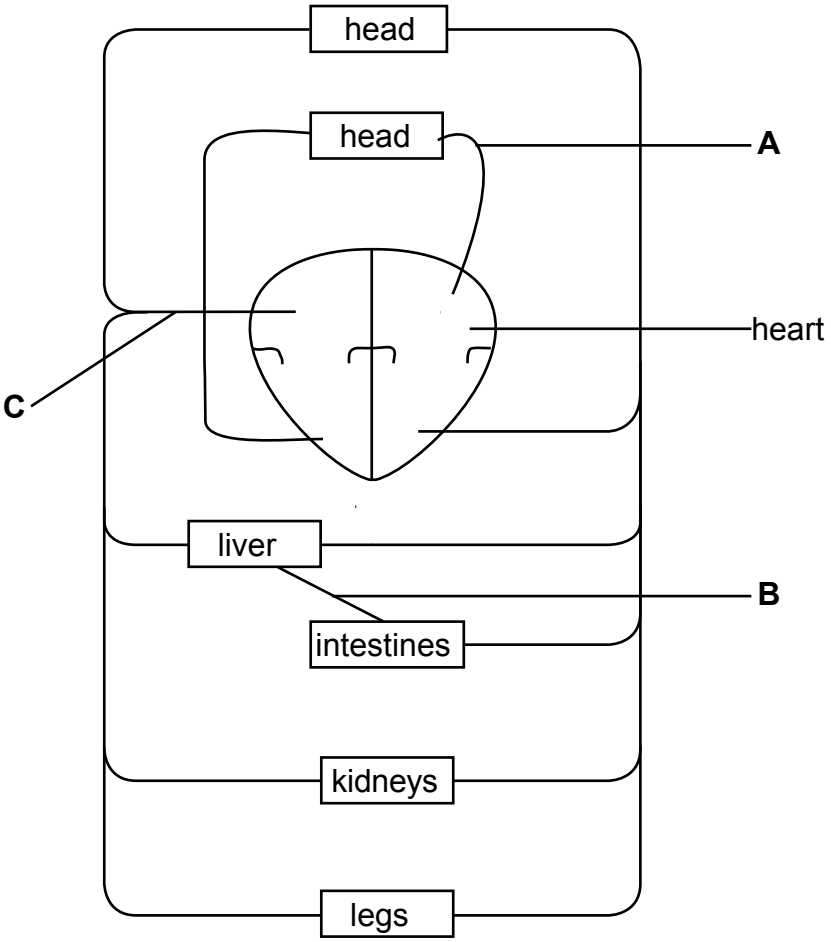

Fig. 4.1

(a) (i) On Fig. 4.1, draw arrows on each of blood vessels **A**, **B** and **C** to show the direction of blood flow. [1]

(ii) Name the blood vessels labelled **A**, **B** and **C** on Fig. 4.1.

A .....

B .....

C ..... [3]

(b) Table 4.1 shows some features of some blood vessels.

Complete Table 4.1 by putting a

✓ if the feature is present

× if the feature is absent

Table 4.1

feature	blood vessel		
	pulmonary artery	vena cava	capillary
thick, elastic wall	✓		×
valves present	✓		
transports deoxygenated blood		✓	
tissue fluid passes through wall			

[4]

(c) Explain how coronary heart disease may lead to a heart attack.

.....

.....

.....

.....

.....

.....

.....

..... [4]

[12]

For Examiner's Use

5 Fig. 5.1 shows part of the carbon cycle.

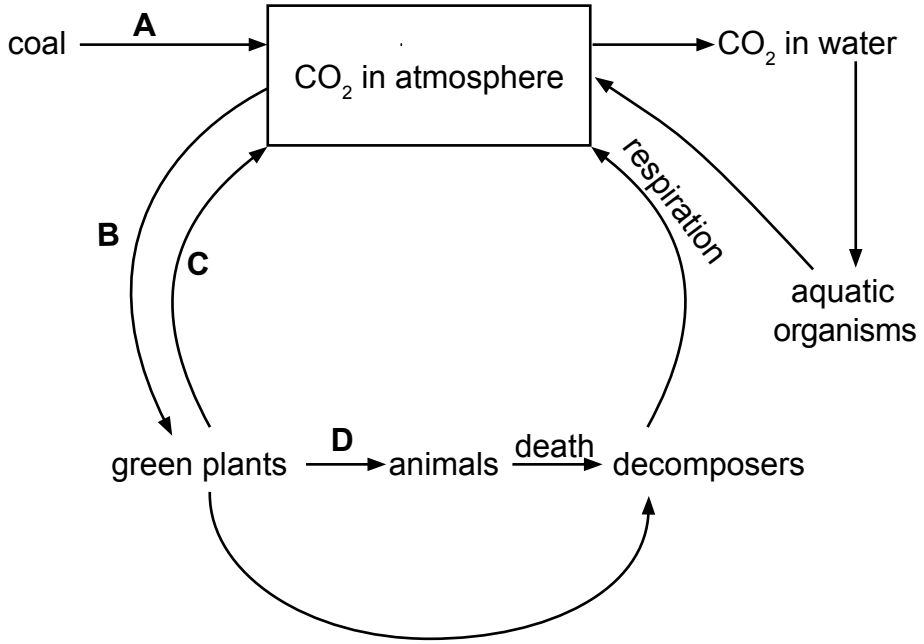

Fig. 5.1

(a) Identify the processes **A**, **B**, **C** and **D** in Fig. 5.1.

A.....

B.....

C .....

D ..... [4]

(b) State the **word** equation for aerobic respiration.

.....

..... [2]

(c) Discuss how the burning of fossil fuels may affect the carbon cycle.

.....

.....

.....

.....

.....

..... [3]

[9]

For Examiner's Use

6 Table 6.1 shows the results of a study conducted in infants aged from a day old to 3 months. The study looked at the number of infections by some common infectious infant diseases among three categories of infants.

Group 1 were fed with breast milk
Group 2 were fed with standard formula milk.
Group 3 were fed with bacteria and fungi enriched formula milk which keeps the alimentary canal healthy.

Table 6.1

infectious infant disease	percentage of infection		
	fed with breast milk	fed with standard formula	fed with bacteria and fungi-enriched formula
upper respiratory tract infections	3.0	60.0	37.0
acute diarrhoea	1.9	90.1	8.0
genital and urinary infection	0.4	37.0	62.6
viral skin infections	0.1	69.7	30.2

(a) (i) The total number of infants who were fed with standard formula milk was 322.

Calculate the number of these infants who had acute diarrhoea.

[2]

(ii) Which disease recorded the highest percentage of infection amongst infants fed with the bacteria and fungi-enriched formula.

..... [1]

(iii) Suggest why breast-fed infants were least affected by common infant diseases in this study.

.....

.....

.....

..... [2]

(b) (i) Define the term *pathogen*.

.....

..... [1]

(ii) The human body has barriers to defend itself against pathogens. Name **three** mechanical barriers of the body.

1 .....

2 .....

3 ..... [3]

(c) Describe the events leading to long-term naturally acquired immunity.

.....

.....

.....

.....

.....

.....

.....

..... [4]

[13]

For Examiner's Use

7 Fig. 7.1 shows a genetic cross between a black rabbit and a white rabbit. The male rabbit is pure-breeding for white fur colour and the female rabbit is pure-breeding for black fur colour.

The dominant allele can be represented by **B** and the recessive allele can be represented by **b**.

All four of their offspring had black fur.

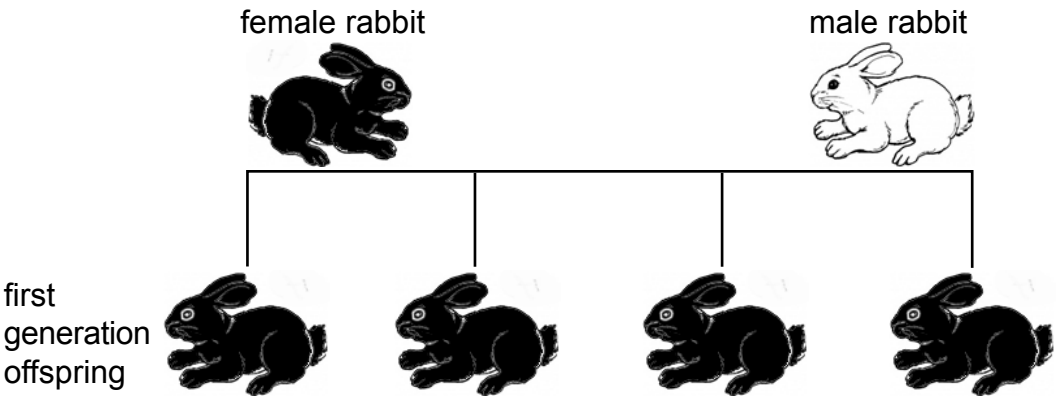

Fig. 7.1

(a) With reference to Fig. 7.1

(i) state the phenotype of the female parent,

..... [1]

(ii) state the genotype of the female parent,

..... [1]

(iii) state the genotype of the heterozygous offspring.

..... [1]

(b) Two of the first generation offspring were crossed. They produced four second generation offspring. These are labelled **W**, **X**, **Y** and **Z** in Fig. 7.2.

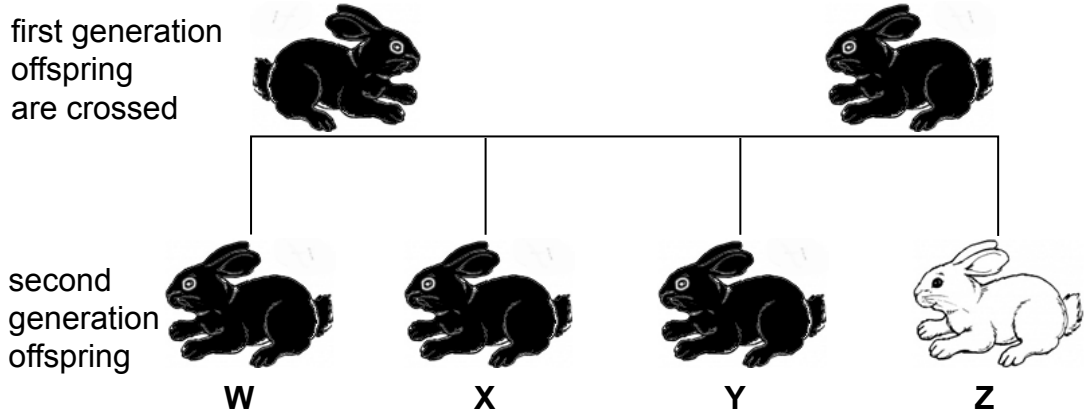

Fig. 7.2

State the genotypic and phenotypic ratio of the second generation offspring.

(i) genotypic ratio

..... [1]

(ii) phenotypic ratio

..... [1]

(c) Hypotrichosis is a recessive disorder caused by a gene mutation that nearly eliminates the growth of any fur in rabbits. Rabbits with this condition die quickly in the wild.

(i) What is meant by the term *gene mutation*?

.....

..... [1]

(ii) Suggest why rabbits with hypotrichosis disorder die quickly during winter in the wild.

.....

.....

.....

..... [2]

For Examiner's Use

(iii) Using **H** for the normal gene and **h** for the recessive mutant gene, draw a genetic diagram to show how two parents without hypotrichosis may produce offspring with hypotrichosis.

[5]

[13]

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