Centre Number	Candidate Number	Candidate Name

NAMIBIA SENIOR SECONDARY CERTIFICATE

BIOLOGY ORDINARY LEVEL

4322/2

PAPER 2

2 hours

Marks 100

2020

Additional Material: 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	

Marker	
Checker	

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

Republic of Namibia

MINISTRY OF EDUCATION, ARTS AND CULTURE

1 A student has the following organisms to classify:

a cockroach, a housefly, a milipede and a crab

(a) (i) Name the group to which the organisms belong.

..... [1]

(ii) List **three** characteristic features of the group mentioned in **(a)(i)**.

1 .....

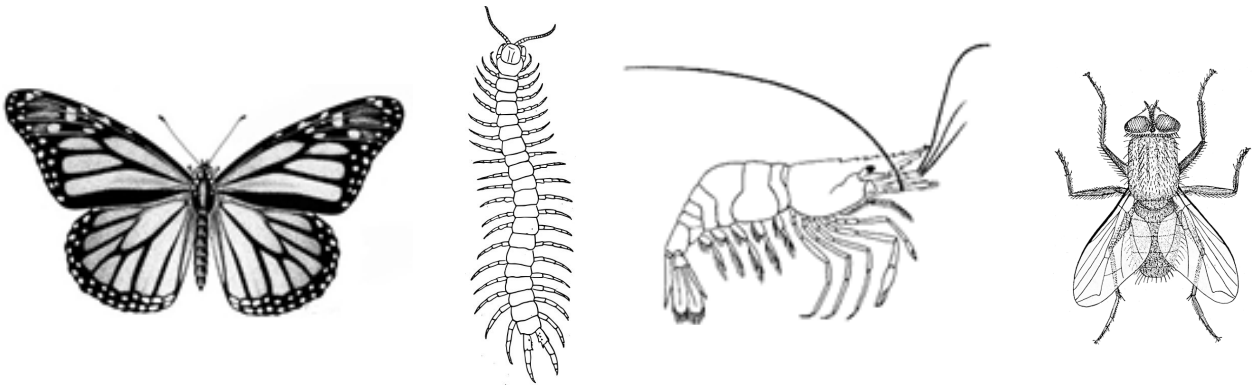
2 .....

3 ..... [3]

(iii) State the class to which the cockroach and housefly belong.

..... [1]

(b) Fig. 1.1 shows four organisms. Use the key to identify the organisms. Complete Table 1.1 to show your identifications.



A **B** **C** **D**

Fig. 1.1

Key

1	Wings present	go to 2
	Wings absent	go to 3
2	One pair of wings	*Musca domestica*
	Two pairs of wings	*Danaus plexippus*
3	One pair of antennae	*Scolopendra morsitans*
	Two pairs of antennae	*Macrobrachium vollenhovenii*

Table 1.1

name of organism	letter
Musca domestica	
Danaus plexippus	
Scolopendra morsitans	
Macrobrachium vollenhovenii	

[2]

(c) Name and describe the system used to name organisms such as *Danaus plexippus.*

.....

.....

.....

..... [2]

(d) Describe **two** external characteristics that monocotyledons and dicotyledons both have.

1 .....

.....

2 .....

..... [2]

[11]

2 Green leaves are organs used in photosynthesis.

(a) Identify the leaf parts described in the statements below.

(i) cells which make food by photosynthesis

..... [1]

(ii) channels that transport water

..... [1]

(iii) hole/opening which lets gases in and out of the leaf

..... [1]

(iv) tubes that transport organic substances

..... [1]

(b) Fig. 2.1 shows the effect of increasing carbon dioxide concentration on the rate of photosynthesis.

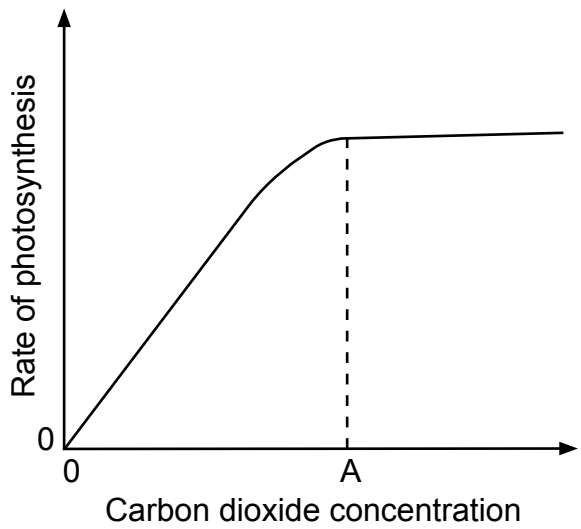


Fig. 2.1

Suggest **two** factors that limit the photosynthetic rate at point **A** on Fig. 2.1.

.....

.....

.....

..... [2]

(c) Jay and Sakina used the apparatus in Fig. 2.2 to measure oxygen released at different light intensities. Results are shown in Table 2.1.

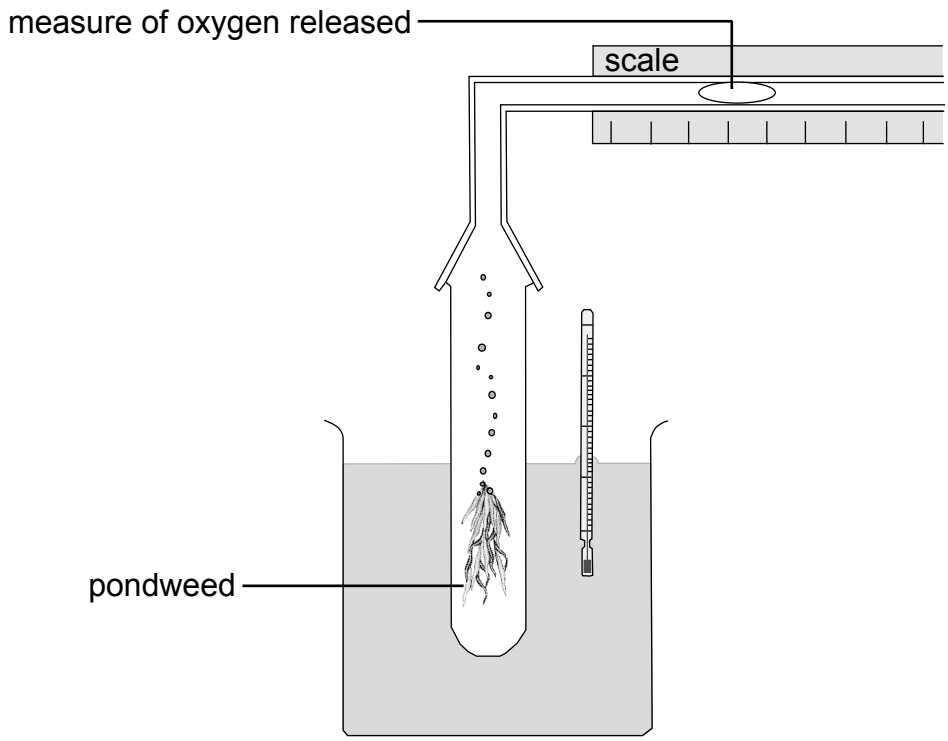
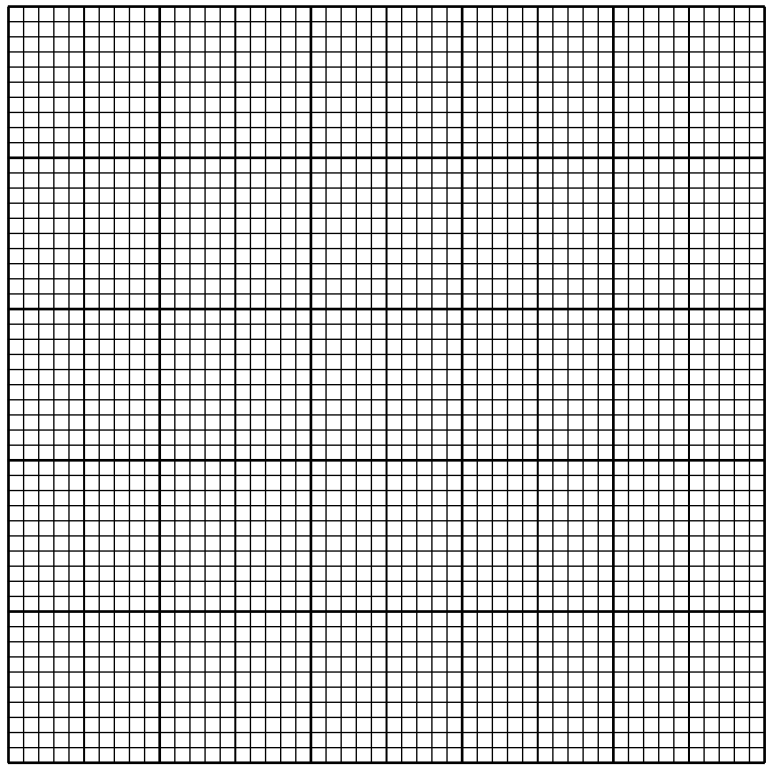


Fig. 2.2

Table 2.1

light intensity (arbitrary units)	**volume of oxygen released (mm^3/minute)**
1	7
2	14
3	21
4	28
5	34
6	39
7	42
8	44
9	45
10	45

(i) Use the information in Table 2.1 to plot a graph on the grid provided.



[4]

(ii) Use the graph to predict the light intensity at which the plant produced 25 mm^3 of oxygen per minute.

..... [1]

(iii) State which level of light intensity has the greatest effect on the rate of photosynthesis.

..... [1]

(iv) Explain how the information in Table 2.1 can be of use to a farmer growing tomatoes in a greenhouse.

.....

..... [1]

[13]

3 The human heart is an example of an organ.

(a) Name the type of muscle that makes up the heart.

..... [1]

(b) Name the ventricle that has the thickest wall.

..... [1]

(c) State the function of the coronary arteries.

.....

..... [1]

(d) The heart pumps blood by contracting and relaxing.

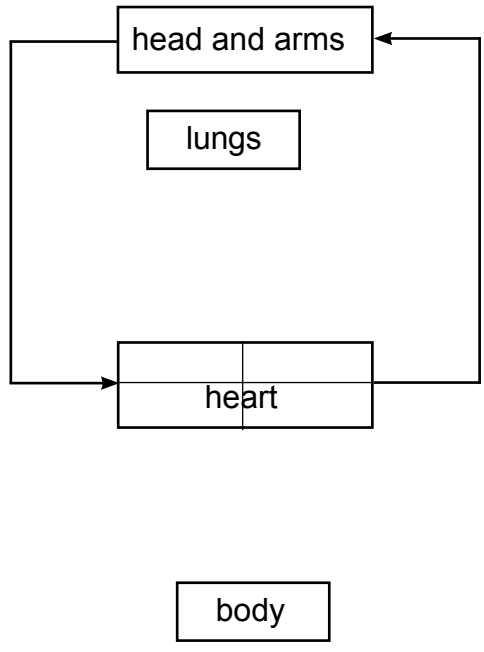
Describe what happens to the blood when the heart contracts.

.....

..... [1]

(e) **(i)** Fig. 3.1 shows an incomplete diagram of blood circulation between some of the organs in the body.

Complete Fig. 3.1 by drawing in the aorta, pulmonary artery, pulmonary vein and vena cava using **labelled** lines with arrow heads showing the direction of blood flow.



[4]

Fig. 3.1

(ii) State the function of the hepatic portal vein.

.....

..... [1]

(f) Complete Table 3.1 to compare **three** structural differences between arteries and veins.

Table 3.1

arteries	veins
1.....	.....
.....	.....
2.....	.....
.....	.....
3.....	.....
.....	.....

[3]

[12]

4 Fig. 4.1 shows the outline of Aina's body.

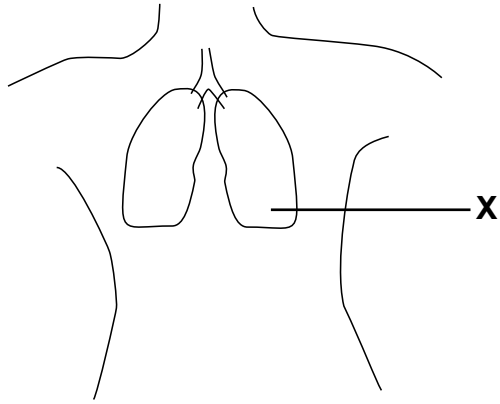


Fig. 4.1

(a) Name the organ labelled **X** in Fig. 4.1.

..... [1]

(b) Aina starts a 10 km race. Aerobic respiration takes place in her cells.

Complete the equation for aerobic respiration.

$C_6H_{12}O_6$ + ... ⟶ ..... + $6H_2O$ + energy [2]

(c) As Aina approaches the 9 km mark, her muscles feel tired.

(i) Name the type of respiration taking place now.

..... [1]

(ii) Complete the word equation for the type of respiration that takes place in the absence of oxygen.

glucose ⟶ ..... + energy [1]

(d) Describe how Aina's intercostal muscles and diaphragm are involved in getting air into her lungs.

.....

.....

.....

.....

.....

..... [3]

(e) Aina noticed that after the 10 km race was completed she was still out of breath even though she stopped running.

Explain why Aina was still out of breath (panting).

.....

.....

.....

.....

.....

..... [3]

(f) The glucose used by Aina during her race came from the breakfast she ate.

Explain how the carbohydrate Aina ate ended up in her bloodstream as glucose.

.....

.....

.....

.....

.....

..... [3]

[14]

For Examiner's Use

5 **(a)** Choose words from the box to complete the paragraph below.

effectors	feedback	homeostasis	receptors

..... is the maintenance of a constant internal environment around the cells. Changes in the internal environment are detected by ..... resulting in corrective actions to bring the environment back to normal. Negative ..... has a role in maintaining homeostasis. [3]

(b) Many organs in the human body play a part in homeostasis.

Complete Table 4.1.

Table 4.1

homeostatic organ	**factor controlled**
(i).....	glucose content of blood
pancreas	**(ii)**.....

[2]

(c) Discuss the principle of negative feedback in the regulation of blood glucose level in humans.

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

..... [6]

[11]

6 **(a)** Identify the parts of the human eye described below.

(i) It carries out nerve impulses from the eye to the brain.

..... [1]

(ii) It contains muscles which change the shape of a lens.

..... [1]

(iii) It prevents light being reflected around the eye.

..... [1]

(iv) It is a clear window at the front of the eye.

..... [1]

(b) Describe what shape the lens would be when a person looks at a tree in the distance.

..... [1]

(c) A person walks from sunlight into a dark room.

Describe how the pupils change in size and suggest why this change occurs.

How.....

.....

.....

.....

.....

.....

Why.....

..... [4]

(d) Fig 6.1 shows part of a reflex arc.

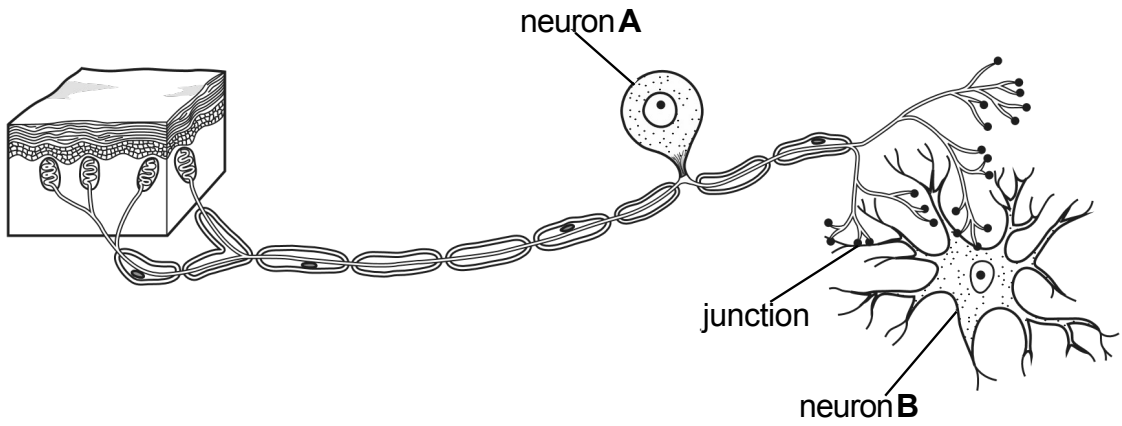


Fig. 6.1

(i) Identify neurone **A**.

..... [1]

(ii) State the location of neurone **B** in the body.

..... [1]

(iii) State the name of the gaps found at the junctions between neurone **A** and neurone **B**.

..... [1]

(e) Explain why the central nervous system can be called the coordinator of the human body.

.....

.....

.....

..... [2]

[14]

7 Fig. 7.1 shows the cross-section of a flower.

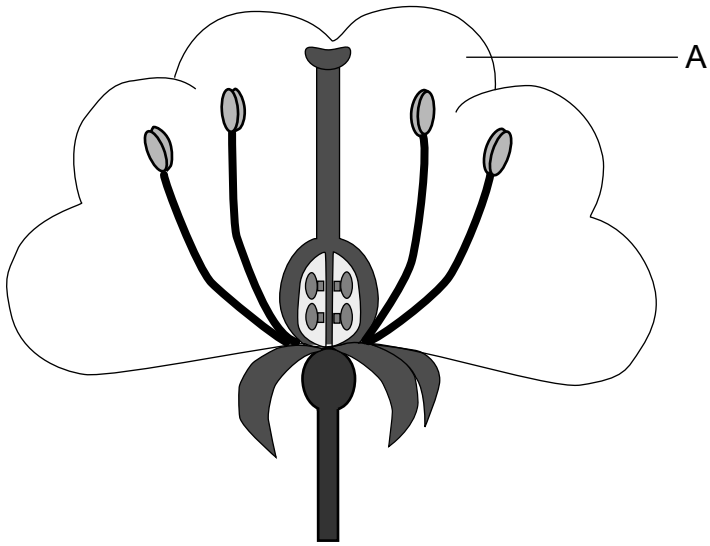


Fig. 7.1

(a) (i) State both the name and the function of part **A** in Fig. 7.1.

Name.....

Function ..... [2]

(ii) On Fig.7.1 name and label the male reproductive parts. [2]

(iii) State where pollination takes place in a flower.

..... [1]

(b) (i) With reference to Fig. 7.1, describe how the process of pollination is likely to be carried out in this flower.

.....

.....

.....

.....

.....

.....

.....

..... [4]

(ii) State what happens to the ovary in flowers after fertilisation.

..... [1]

(c) The plant in Fig. 7.1 reproduces sexually. Gametes are produced.

(i) Describe the difference between meiosis and mitosis.

.....

.....

..... [1]

(ii) State where meiosis occurs in the flower in Fig. 7.1

..... [1]

(d) Sort the list into haploid and diploid by placing the following words into the table:

sperm, anther, liver cell, zygote, pollen grain.

haploid	diploid
.....	.....
.....	.....
.....	.....

[2]

[14]

For Examiner's Use

8 Fig. 8.1 shows part of the female reproductive system during pregnancy.

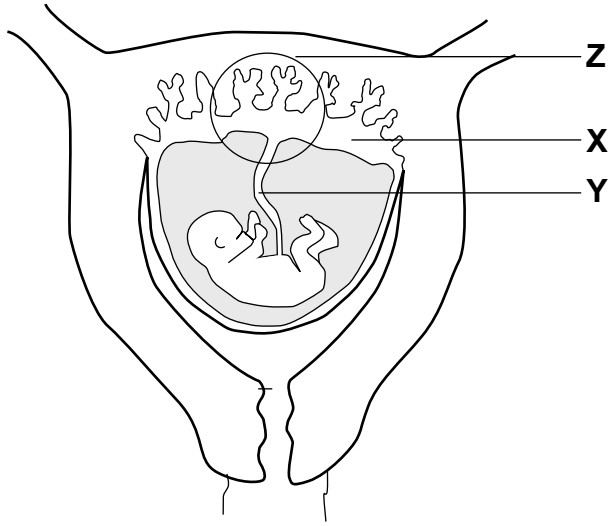


Fig. 8.1

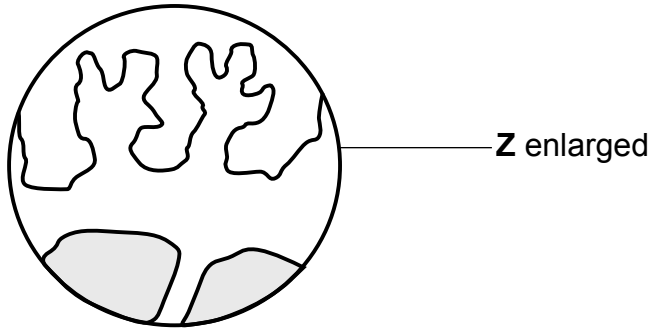


Fig. 8.2

(a) (i) Name **two** hormones involved in the menstrual cycle and name the site of production of these hormones in the female reproductive system.

Name of hormone .....

Name of hormone .....

Name of organ ..... [3]

(ii) Explain how the contraceptive pill prevents pregnancy.

.....

.....

.....

..... [2]

(b) (i) Identify structures **X** and **Y** on Fig. 8.1.

X.....

Y..... [2]

(ii) Explain **one** visible adaptation of structure **X** on Fig. 8.1, shown enlarged as **Z** in Fig. 8.2, which aids in its function of nourishment of a developing foetus.

.....

..... [2]

(c) An increase in reported cases of Human Immuno-dificiency virus (HIV) is observed in a town.

Suggest **two** possible recommendations that health workers could give to people in the town to reduce the cases of HIV.

1 .....

.....

2 .....

..... [2]

[11]

BLANK PAGE

BLANK PAGE

BLANK PAGE