EXAMINATIONS COUNCIL OF ESWATINI
Eswatini General Certificate of Secondary Education

CANDIDATE NAME									
CENTRE NUMBER						CANDIDATE NUMBER			

BIOLOGY **6884/02**

Paper 2 Structured Questions **October/November 2021**

1 hour 15 minutes

Candidates answer on the Question Paper.

No Additional Materials are required.

READ THESE INSTRUCTIONS FIRST

Write your Centre number, candidate number and name in the spaces provided.
Write in dark blue or black pen.
You may use an HB pencil for any diagrams, graphs or rough work.
Do **not** use staples, paper clips, glue or correction fluid.
Do **not** write on the barcode.

Answer **all** questions.

You may use an electronic calculator.
You may lose marks if you do not show your working or if you do not use appropriate units.

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	

This document consists of **14** printed pages and **2** blank pages.

1 **(a)** Biologists classify organisms according to their characteristics, resulting in a hierarchical order.

List the seven levels of classification of living organisms in hierarchical order. The first and last ones have been done for you.

Kingdom

.....

.....

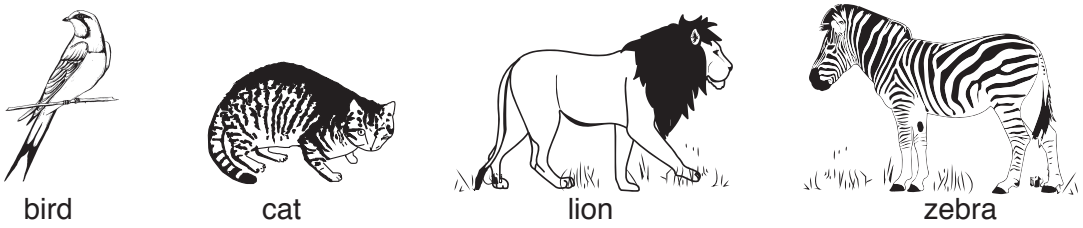
.....

.....

.....

Species [4]

(b) Fig. 1.1 shows a bird, a cat, a lion and a zebra.



bird cat lion zebra

Fig. 1.1

Construct a dichotomous key that can be used to identify the organisms in Fig. 1.1.

Use only the following points in the given order to make your key:

- number of legs
- stripes on body
- tail

1 .....

.....

2 .....

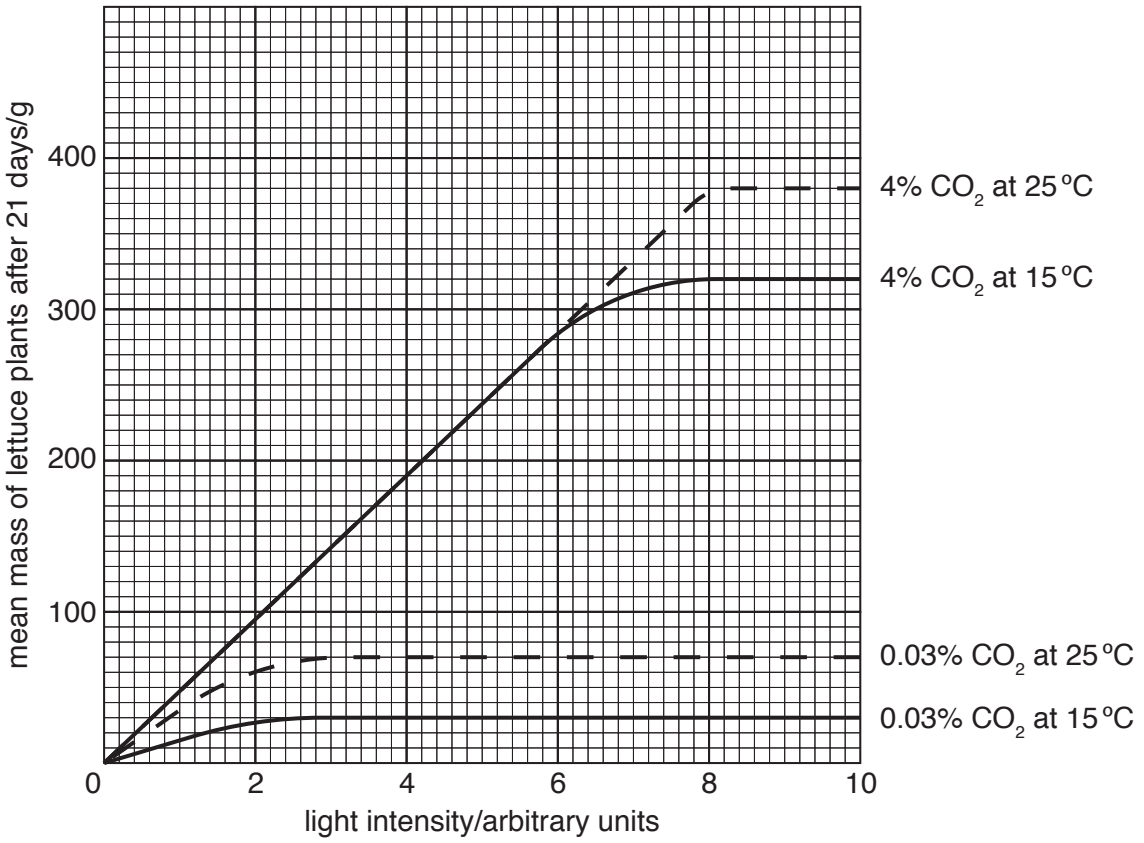
.....

3 .....

..... [3]

[Total: 7]

2 In an investigation, different groups of lettuces were grown under varying conditions of carbon dioxide concentration, light and temperature. After 21 days, the mean mass of each group was calculated. The results of the investigation are shown in the graph.



(a) (i) State the mean mass of lettuces grown in a carbon dioxide concentration of 0.03%, a light intensity of 4 arbitrary units and a temperature of 25 °C.

..... [1]

(ii) The mean mass of one group of lettuces was 335 g. Using the graph, identify the light intensity, carbon dioxide concentration and temperature at which these had been grown.

light intensity .....

CO_2 concentration .....

temperature ..... [1]

[Turn over

(b) At a light intensity of 8 arbitrary units, the mean mass of lettuces grown in 0.03% carbon dioxide at 15 °C was 30 g.

At the same light intensity, but in 4% carbon dioxide and a temperature of 25 °C, the mean mass of lettuces was 380 g.

Suggest reasons for the observed difference in the mean masses.

.....

.....

.....

.....

..... [3]

(c) Suggest and explain **one** feature of a greenhouse that would help the lettuce plants to grow faster and more healthily.

feature .....

.....

explanation .....

.....

..... [3]

(d) State the equation of photosynthesis in symbols.

..... [2]

(e) A lettuce plant is sprayed with a pesticide to kill the worms that feed on the leaves.

Describe how the pesticide is distributed within the lettuce plant.

.....

.....

.....

..... [2]

[Total: 12]

3 The skin and kidney are involved in homeostasis.

(a) Define the term *homeostasis*.

.....

..... [1]

(b) Fig. 3.1 is a diagram of a section through the skin of an athlete taking part in a 200m race.

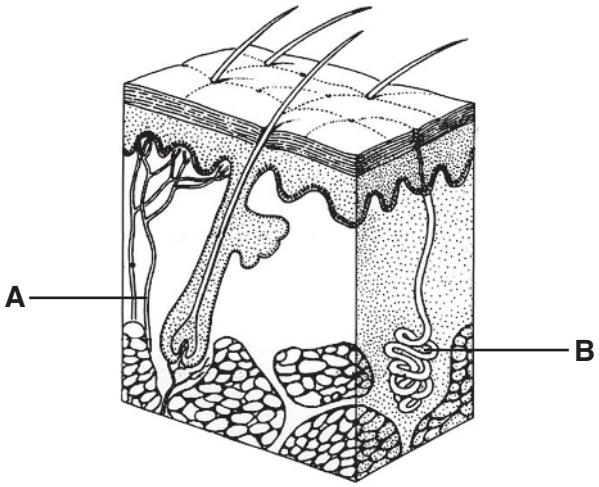


Fig. 3.1

With reference to letters **A** and **B** on Fig. 3.1, describe the mechanisms by which the body temperature of the athlete is returned to normal when it increases to 38 °C.

A .....

.....

.....

.....

B .....

.....

.....

..... [4]

[Turn over

(c) The athlete's rate of heart beat increases from 60 to 90 beats per minute during the race.

Explain the advantage to the athlete of the increased rate of heart beat.

.....

.....

.....

..... [3]

(d) Fig. 3.2 is a diagram of a kidney tubule.

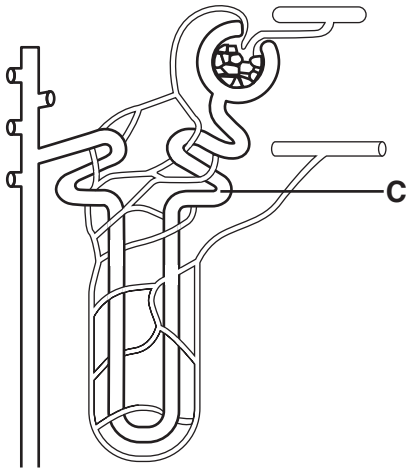


Fig. 3.2

(i) Describe the process that takes place at the part labelled **C**.

.....

.....

.....

..... [3]

(ii) Explain how a dialysis machine efficiently removes unwanted substances from the blood in cases of kidney failure.

.....

.....

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..... [4]

[Total: 15]

4 Fig. 4.1 is an apparatus used to investigate the rate of water uptake by a leafy shoot.

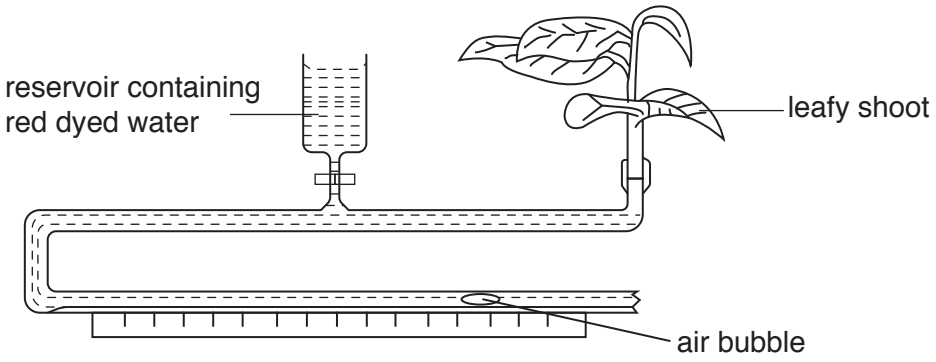

Fig. 4.1

(a) Name **two** environmental conditions that could be varied when investigating the rate of water uptake by the leafy shoot in this apparatus.

1 .....

2 ..... [2]

(b) Describe and explain how water is transported from the stem of this leafy shoot to the atmosphere.

.....

.....

.....

.....

.....

..... [4]

(c) After an hour, the stem of the leafy shoot was thinly sliced, put on a microscope slide and observed under the microscope. Fig. 4.2 shows an outline of a thin slice of the stem as seen under the microscope.

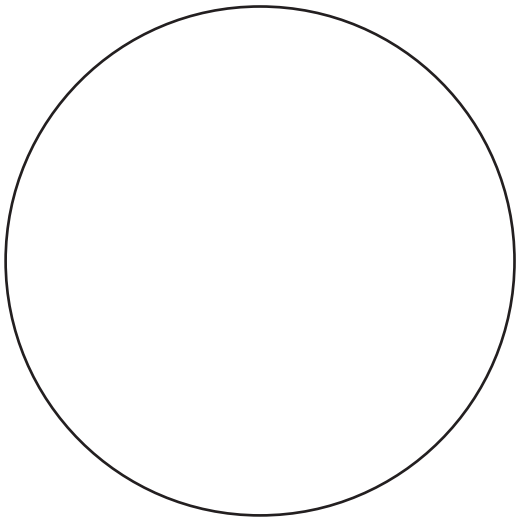

Fig. 4.2

(i) Draw in Fig. 4.2 the vascular bundles to show their distribution in the stem as observed under the microscope. [1]

(ii) On Fig. 4.2, label the part of the vascular bundle in which the red dye would be seen. [1]

(d) After a week the leafy shoot is still in the apparatus but all the water in the apparatus has been used up.

State what will then happen to the leafy shoot.

..... [1]

[Total: 9]

5 Fig. 5.1 shows an illustration of some stages in the menstrual cycle.

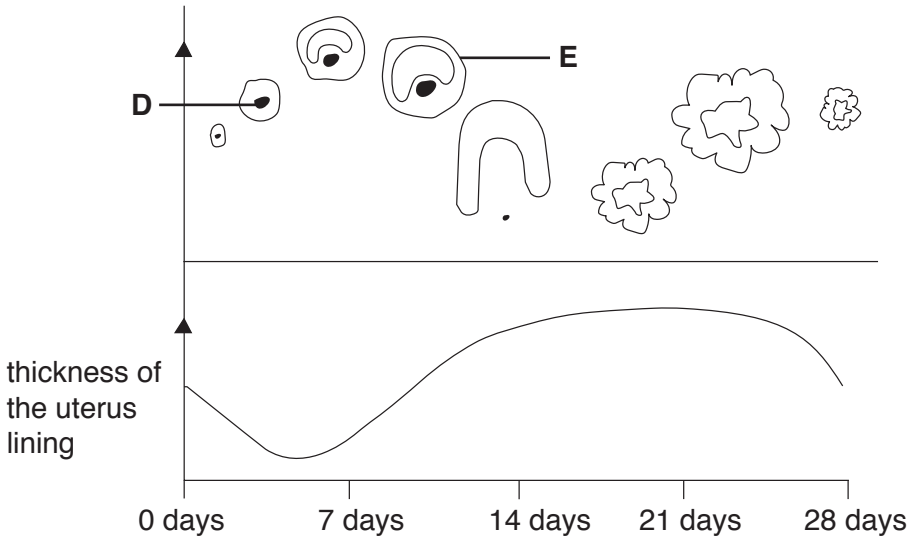

Fig. 5.1

(a) Describe and explain what is happening in the ovary at stages **D** and **E**.

.....

.....

.....

..... [2]

(b) Describe and explain what Fig. 5.1 shows is happening on day 28.

.....

.....

.....

..... [3]

(c) A woman might be unable to conceive even though she has a normal menstrual cycle.

State and explain **two** ways by which infertility in women may be overcome.

1 .....

.....

.....

2 .....

.....

..... [4]

[Turn over

(d) Fig. 5.2 shows a foetus in the uterus just before birth.

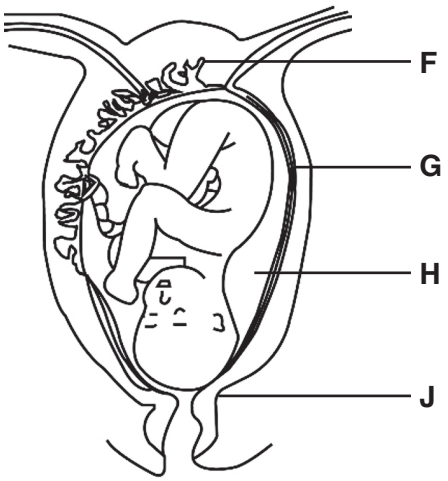

Fig. 5.2

Name the structures **F**, **G**, **H** and **J** and describe the changes they undergo during birth.

F .....

.....

G .....

.....

H .....

.....

J .....

..... [4]

[Total: 13]

6 **(a)** Colour blindness is a sex-linked characteristic.

(i) State the sex chromosomes in humans.

..... [1]

(ii) A man and a woman, both with normal vision, have two daughters and two sons.

Use a genetic diagram to show how one of their sons could be colour blind.

[5]

(iii) Colour blindness is an example of discontinuous variation.

Describe what is meant by *discontinuous variation*.

.....

.....

..... [2]

(b) Fig. 6.2 shows how natural selection occurred in a population of giraffes in a certain habitat.

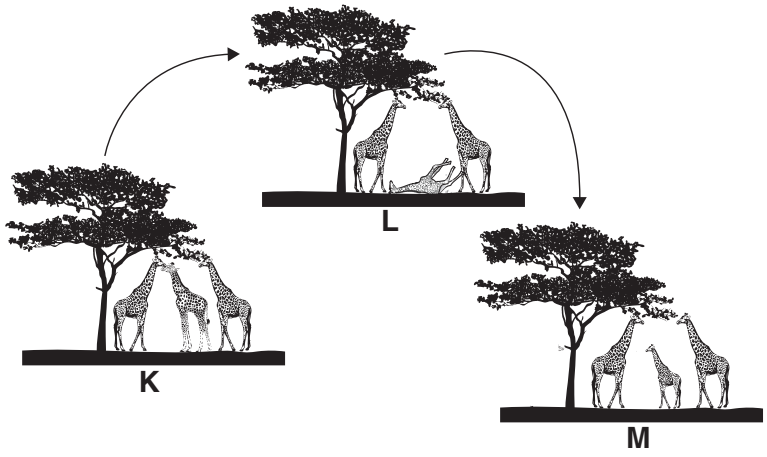

Fig. 6.2

Describe with reference to Fig. 6.2, how natural selection resulted in the evolution of long necked giraffes.

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..... [5]

[Total: 13]

7 **(a)** Fig. 7.1 shows the nitrogen cycle.

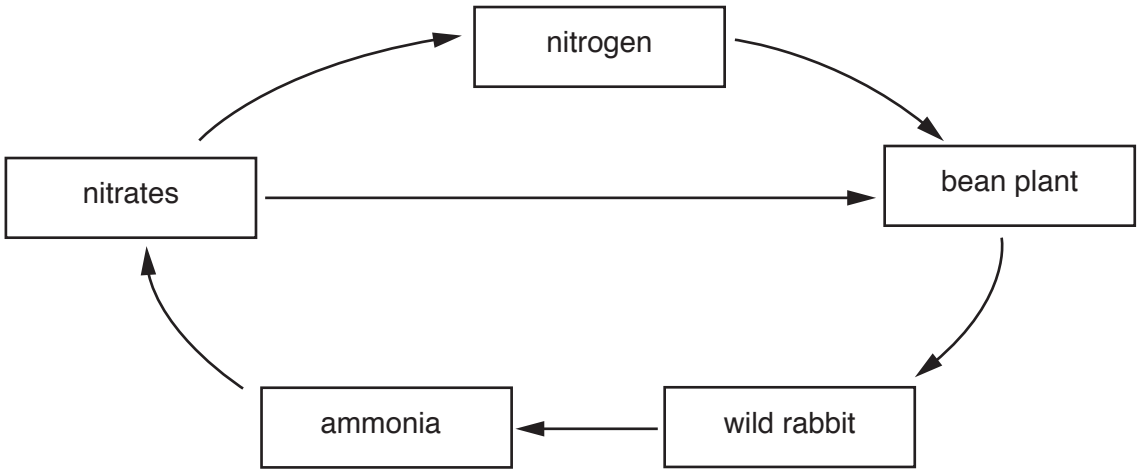

Fig. 7.1

(i) Construct a food chain from Fig. 7.1.

..... [1]

(ii) Describe, with reference to **P** and **Q**, how nitrogen gas from the atmosphere is used by the wild rabbit to form its tissues.

P .....

.....

.....

Q .....

.....

..... [4]

(iii) The wild rabbit is becoming an endangered species.

State **two** ways by which the wild rabbit can be conserved.

1 .....

.....

2 .....

..... [2]

[Turn over

(b) Describe the undesirable effects caused by artificial fertilisers running off fields into nearby rivers or other water sources.

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.....

.....

.....

..... [4]

[Total: 11]

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