EXAMINATIONS COUNCIL OF SWAZILAND
in collaboration with
UNIVERSITY OF CAMBRIDGE INTERNATIONAL EXAMINATIONS
Swaziland General Certificate of Secondary Education

CANDIDATE NAME

CENTRE NUMBER | | | | | |

CANDIDATE NUMBER | | | | |

9752810706

BIOLOGY **6884/03**

Paper 3 Extended **October/November 2012**

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 on all the work you hand in.
Write in dark blue or black pen.
You may use a soft pencil for any diagrams, graphs or rough working.
Do not use staples, paper clips, highlighters, glue or correction fluid.

Answer **all** questions.
Write your answers in the spaces provided on the question paper.

You may use a calculator.

At the end of the examination, fasten all your work securely together.
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	

This document consists of **13** printed pages and **3** blank pages.

1 Fig. 1.1 shows a bacterium.

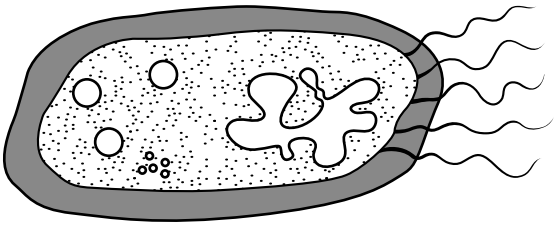

Fig. 1.1

(a) State two visible features present in Fig. 1.1 that are also present in an animal cell.

1 .....

2 .....[2]

(b) Some species of bacteria are widely used in industry.

Describe how bacteria are used in the production of yoghurt.

.....

.....

.....

.....

.....

.....

.....[5]

(c) Genetic engineering is used to produce human insulin.

(i) Outline the steps used in the production of human insulin using genetic engineering.

.....

.....

.....

.....

.....

.....[4]

(ii) Suggest two advantages of using bacteria in the production of insulin.

1 .....

.....

2 .....

.....[2]

(d) (i) Name two features that distinguish viruses from bacteria.

1 .....

2 .....[2]

(ii) Outline how HIV affects the immune system.

.....

.....

.....

.....

.....[3]

[Total: 18]

[Turn over

2 Fig. 2.1 shows the end products of the digestion of proteins, fats and starch. The width of each band (shaded area) indicates the amount of end-product present in each part.

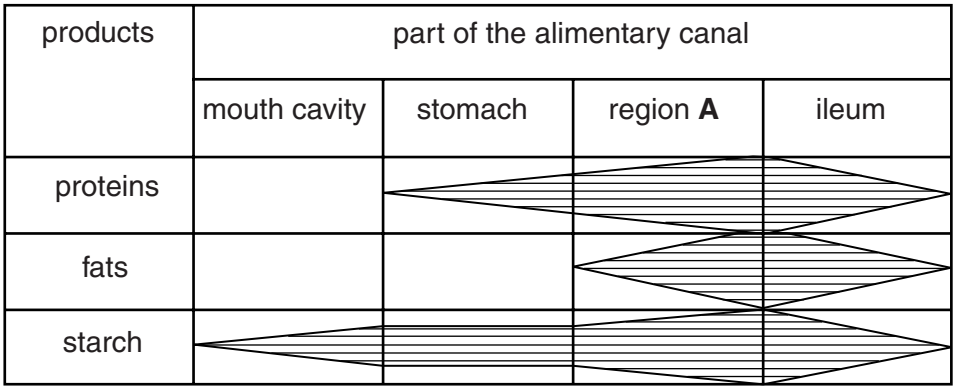

Fig. 2.1

(a) Name region **A**.

.....[1]

(b) Explain why there is no end-product of fat digestion in the mouth cavity.

.....

.....

.....

.....[2]

(c) Explain why the amount of end-product of starch digestion does not increase in the stomach.

.....

.....

.....

.....[2]

(d) State why the amounts of end-product of all three nutrients shown in Fig. 2.1 decrease in the ileum.

.....

.....[1]

Food is moved along the alimentary canal by peristalsis.

(e) Describe the process of peristalsis in the oesophagus.

.....

.....

.....

.....

.....[3]

[Total: 9]

3 Fig. 3.1 shows some cells and part of the xylem in a root.

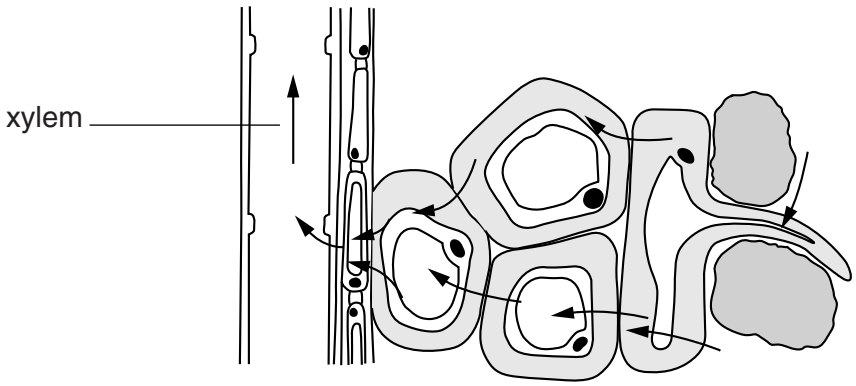

Fig. 3.1

(a) (i) Describe how the xylem is adapted for its function.

.....

.....

.....

.....

.....[4]

(ii) Explain the mechanism that enables the movement of water as shown by the arrows in Fig. 3.1.

.....

.....

.....

.....

.....

.....

.....[5]

(b) A farmer investigated the effects of temperature and cyanide poisoning on the rate of uptake of magnesium ions by the root. The results are shown in Table 3.1.

Table 3.1

experiment	treatment	results
B	temperature increased to 40 °C	rate of uptake increased
C	roots treated with cyanide to inhibit respiration	uptake stopped

(i) Explain the results of experiment **B** and **C**.

B .....

.....

C .....

.....[4]

(ii) The concentration of sugars in the root cells increased when magnesium ion uptake continued for some time.

Explain why the concentration of the sugars increased.

.....

.....

.....[2]

[Total: 15]

[Turn over

4 Fig. 4.1 shows the change in the dry mass of a germinating seed. (Dry mass is the total mass of the seed **excluding** the mass of water present.)

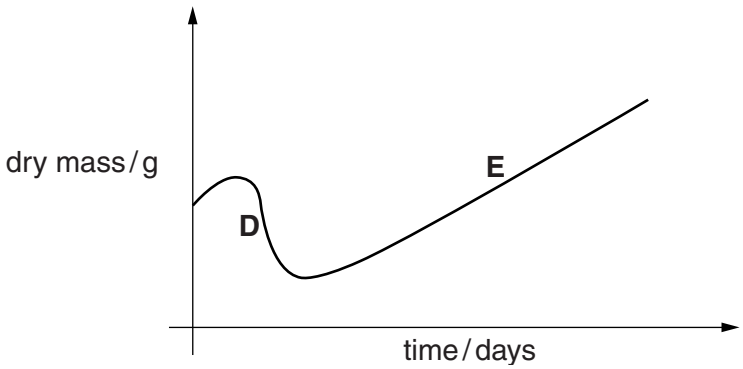

Fig. 4.1

(a) State the role of the following in germination:

(i) oxygen,

.....

.....[1]

(ii) suitable temperature.

.....

.....[1]

(b) Describe and explain the changes in the dry mass of the germinating seed in the stages **D** and **E**.

D .....

.....

.....

.....[3]

E .....

.....

.....

.....[2]

[Total: 7]

5 Fig. 5.1 shows the structures involved in gaseous exchange in the lungs.

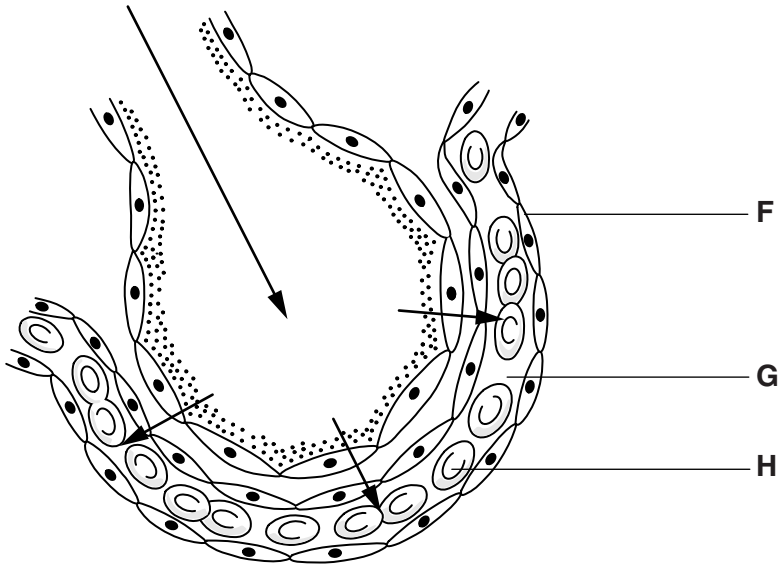

Fig. 5.1

(a) Label structures **F**, **G** and **H** in Fig. 5.1.

F .....

G .....

H .....[3]

(b) Below are statements which describe processes that occur during breathing.

Place a tick (✓) in the box beside each statement that describes a process necessary to cause gas molecules to move in the direction shown in Fig. 5.1.

diaphragm contracts	☐
external intercostal muscles relax	☐
air pressure inside lungs decreases	☐
volume of thoracic cavity decreases	☐
diaphragm becomes dome-shaped	☐

[2]

[Total: 5]

6 Fig. 6.1 shows the structure of a nephron and its blood supply.

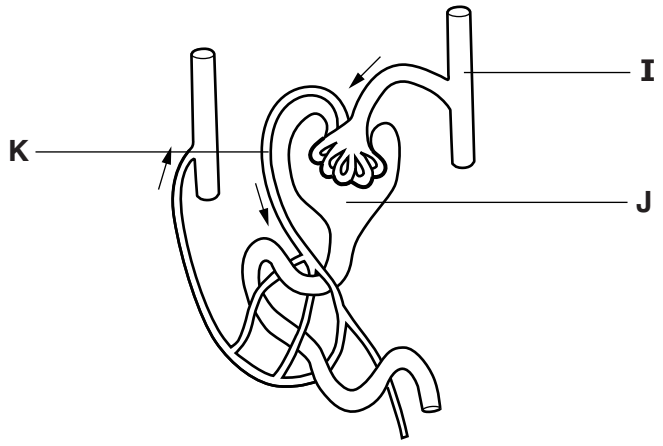

Fig. 6.1

(a) (i) Identify **I** and **J** in Fig. 6.1.

I .....

J ..... [2]

(ii) Explain the importance of the small internal diameter of blood vessel **K** in the functioning of the kidney.

.....

.....

.....[2]

(b) Table 6.1 shows three body fluids and some substances that may be found in them.

Put ticks (✓) in Table 6.1 to show the substances present in each body fluid in a healthy person.

Table 6.1

body fluid	proteins	glucose	urea
blood in glomerulus			
fluid passing into capsule			
urine leaving kidney			

[3]

[Total: 7]

7 Fig. 7.1A shows a seedling placed in the dark and Fig. 7.1B shows the same seedling two days after the first observation.

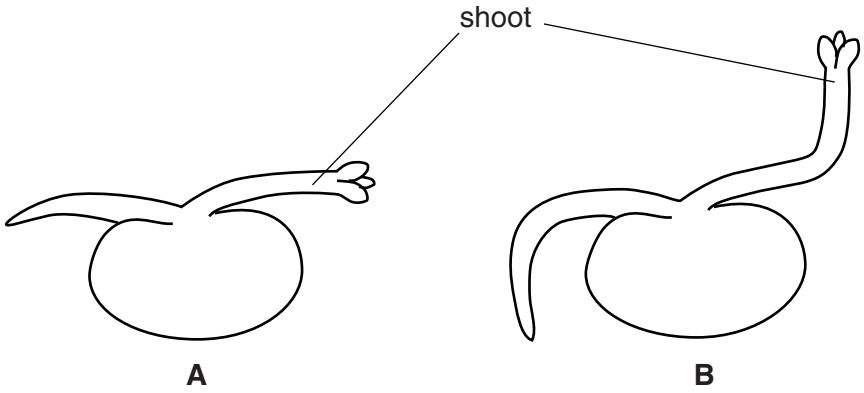

Fig. 7.1

(a) (i) Name the response shown by the shoot of the seedling in Fig. 7.1B.

.....[1]

(ii) Explain the mechanism that caused the root to grow in the direction shown in Fig. 7.1B.

.....

.....

.....

.....

.....[4]

(b) Some synthetic plant hormones are used as weed-killers.

Describe how these synthetic plant hormones kill weeds.

.....

.....[2]

[Total: 7]

8 Rats live in the same habitat as the snakes that eat them. The population of rats living in a habitat of grey rocks was studied over a period of six months. Fig. 8.1 shows the results of the study.

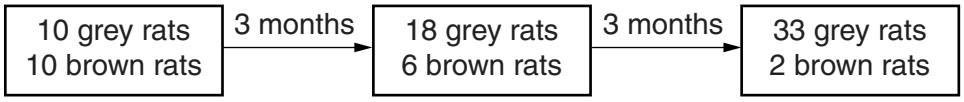

Fig. 8.1

(a) Describe and explain the changes in the population of the rats.

.....

.....

.....

.....

.....

.....[4]

(b) Mutation is one source of variation among species. A sample of insects of a particular species were exposed to X-ray radiation to investigate mutation.

Fig. 8.2 shows the results obtained.

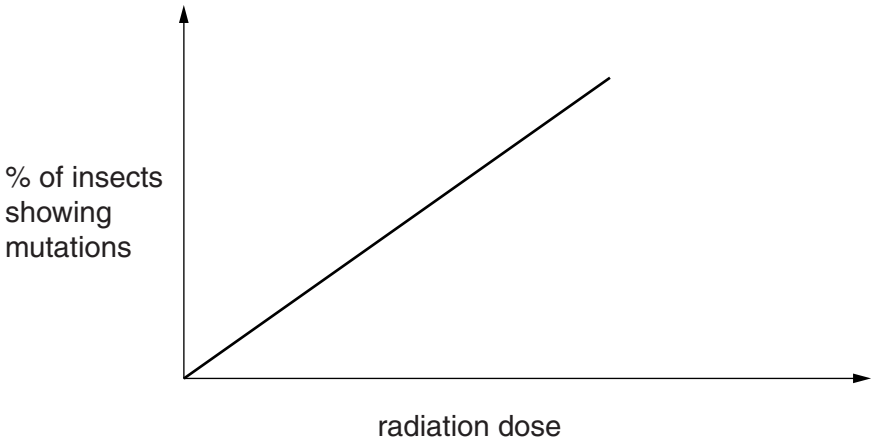

Fig. 8.2

(i) Explain the term *mutation*.

.....

.....[2]

(ii) Describe the relationship between the percentage of insects showing mutations and increasing radiation dose.

.....

.....[1]

(iii) Name one other factor which may increase mutation rates.

.....[1]

(c) Describe how strains of an antibiotic-resistant bacterium develop, such as the strain that causes Multiple Drug Resistant (MDR) tuberculosis.

.....

.....

.....

.....

.....[4]

[Total: 12]

BLANK PAGE

BLANK PAGE

BLANK PAGE