Cambridge International Examinations
Cambridge International General Certificate of Secondary Education

CANDIDATE NAME									
CENTRE NUMBER						CANDIDATE NUMBER			

5746439676

BIOLOGY **0610/32**

Paper 3 Extended **May/June 2014**

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 an HB pencil for any diagrams or graphs.
Do not use staples, paper clips, glue or correction fluid.
DO **NOT** WRITE IN ANY BARCODES.

Answer **all** questions.

Electronic calculators may be used.
You may lose marks if you do not show your working or if you do not use appropriate units.

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.

The syllabus is approved for use in England, Wales and Northern Ireland as a Cambridge International Level 1/Level 2 Certificate.

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

© UCLES 2014

1 Fig. 1.1 shows the change in the biomass of the fungus *Penicillium* when grown in a fermenter to produce the antibiotic penicillin.

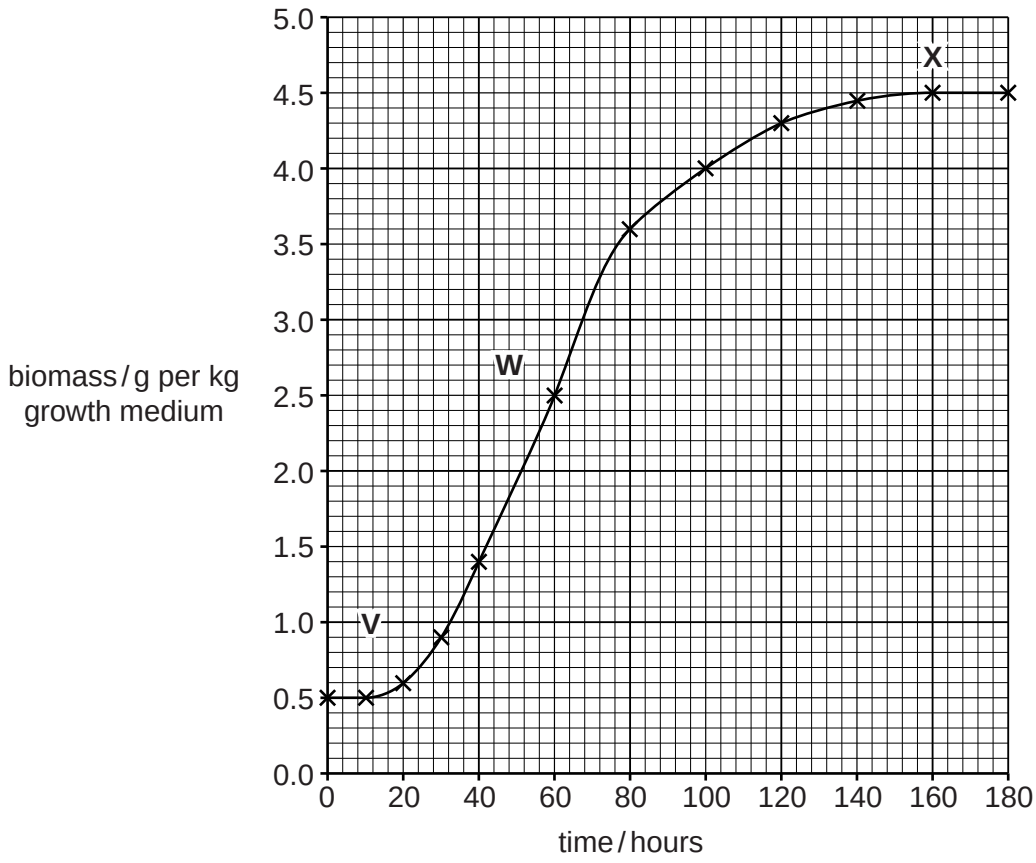


Fig. 1.1

(a) Name the stages in the growth of *Penicillium* indicated by **V**, **W** and **X**.

V .....

W .....

X ..... [3]

(b) State **two** factors that are kept constant when *Penicillium* is grown in a fermenter.

1 .....

2 ..... [2]

(c) Suggest why the growth of *Penicillium* is measured in biomass rather than numbers of cells.

.....

..... [1]

[Total: 6]

© UCLES 2014

BLANK PAGE

2 Fig. 2.1 shows the changes in a human ovary during the first part of the menstrual cycle and after the fertilisation of an egg.

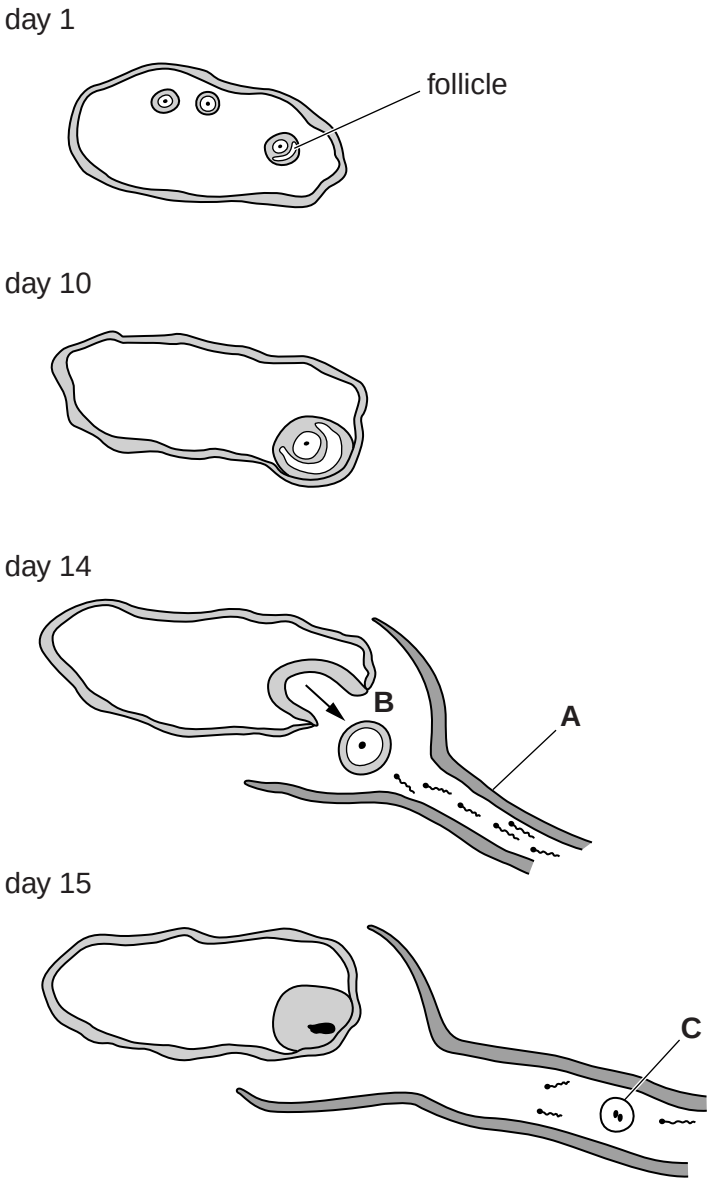


Fig. 2.1

(a) (i) Name:

organ **A** .....

process **B** .....

cell **C**. ..... [3]

(ii) Name the hormone that promotes:

the growth of the follicle .....

process **B**. ..... [2]

(iii) Explain how a sperm cell is adapted for its functions.

.....

.....

.....

.....

.....

.....

.....

.....

.....[3]

(b) Explain the advantages of sexual reproduction to an animal species.

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

..... [5]

[Total: 13]

3 Fig. 3.1 is a diagram of the water cycle.

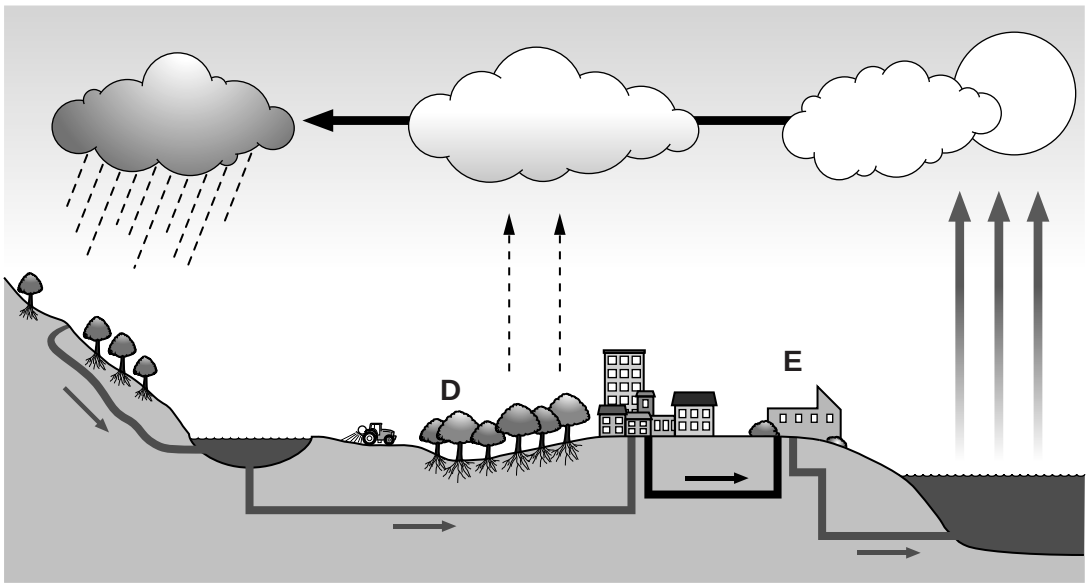


Fig. 3.1

(a) Water is a large component of the cells in the leaves of trees, as labelled **D** on Fig. 3.1.

Explain how water passes from a leaf cell to the atmosphere.

.....

.....

.....

.....

.....

.....

..... [4]

(b) Explain how the loss of water from the leaves helps to move water from the roots to the leaves.

.....

.....

.....

.....

.....

.....

.....

..... [4]

© UCLES 2014

(c) Explain how water enters the roots of the trees from the soil.

.....

.....

.....

.....

.....

..... [3]

(d) Fig. 3.1 shows a sewage treatment works, labelled **E**.

Describe **three** processes used in the treatment of sewage.

1 .....

.....

2 .....

.....

3 .....

..... [3]

(e) Herbicides are used by farmers to control weeds.

Explain the environmental damage that may be caused by herbicides.

.....

.....

.....

.....

.....

.....

..... [3]

[Total: 17]

4 Table 4.1 shows the composition of blood plasma.

Table 4.1

component	concentration in the plasma
adrenaline / ng dm^{-3}	10 – 100
fibrinogen / g dm^{-3}	1.7 – 4.0
glucose / mg dm^{-3}	700 – 1000
hydrogencarbonate ions / g dm^{-3}	1.1 – 1.4
insulin / μg dm^{-3}	0.33 – 0.40
lactic acid / mg dm^{-3}	50 – 200
sodium ions / g dm^{-3}	3.1 – 3.4
urea / mg dm^{-3}	70 – 200

(a) From Table 4.1, name:

(i) an excretory product

..... [1]

(ii) a plasma protein.

..... [1]

(b) **(i)** State what could cause the lactic acid concentration in the blood to increase to 200 mg dm^{-3}.

..... [1]

(ii) State the function of fibrinogen.

..... [1]

(iii) State **two** effects that a concentration of adrenaline of 100 ng dm^{-3} might have on the body.

.....

..... [2]

(c) Table 4.1 shows that the glucose concentration varies between 700 and 1000 mg dm^{-3}. Describe the role of the liver in regulating the concentration of glucose in the body.

.....

.....

.....

.....

..... [3]

© UCLES 2014

(d) Lymphocytes and phagocytes are white blood cells.

A woman had some blood tests taken before and during a bacterial infection.

Table 4.2 shows the number of white blood cells in the two blood samples.

Table 4.2

white blood cells	mean number of cells per mm^3 of blood	
	before infection	during infection
lymphocytes	1300	3500
phagocytes	2000	7500

(i) Calculate the percentage increase in lymphocytes that occurred during the bacterial infection.
Show your working and give your answer to the **nearest whole number**.

answer .....% [2]

(ii) Describe the role of phagocytes in defence against disease.

.....

.....

.....

.....

.....

..... [3]

(iii) Describe the roles of white blood cells in tissue rejection.

.....

.....

.....

.....

.....

.....[3]

[Total: 17]

5 **(a)** Describe how food is moved along the small intestine.

.....

.....

.....

..... [2]

(b) The small intestine is lined by many villi.

Fig. 5.1 shows a longitudinal section of a villus.

Fig. 5.2 shows a cross-section of the same villus at **V** – **W**.

The diagrams are not drawn to the same scale.

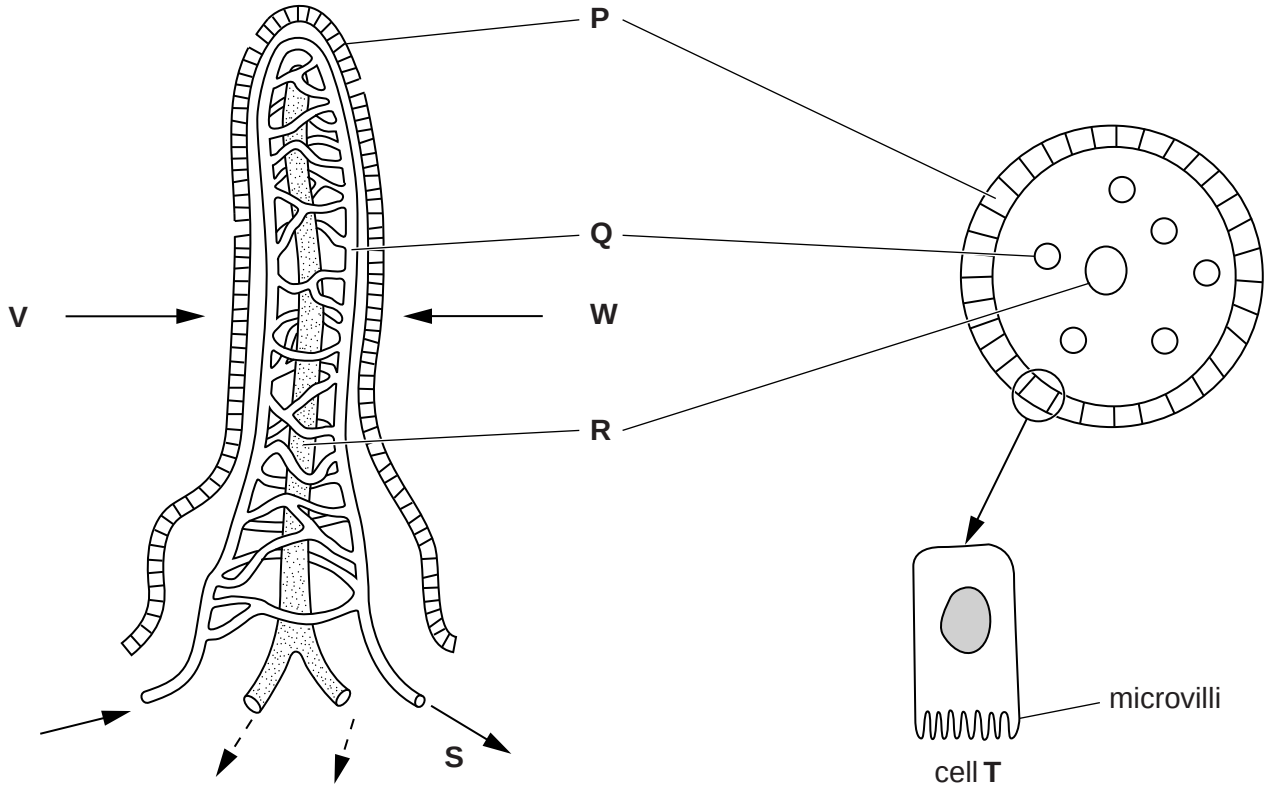


Fig. 5.1 **Fig. 5.2**

(i) Name structures **P**, **Q**, and **R**.

P .....

Q .....

R ..... [3]

(ii) The blood that flows from **S** enters a vein.

Name the vein that transports blood away from the small intestine.

..... [1]

© UCLES 2014

(iii) Cell **T** is an example of the cells that form the surface of the villi.

Explain why there are many microvilli on cell **T**.

.....

.....

.....

.....

..... [2]

(iv) Some of the cells on the surface of the villi secrete mucus for protection.

Suggest what the villi need to be protected against.

.....

.....

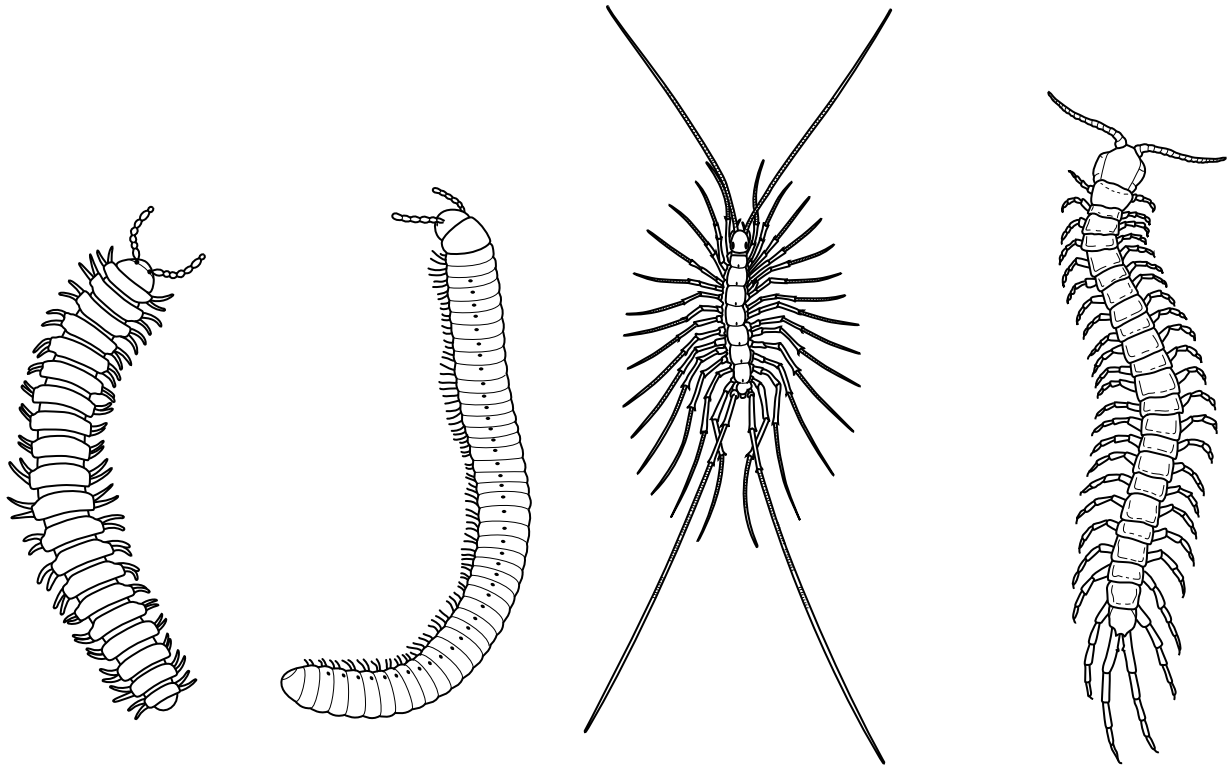
.....

..... [2]

[Total: 10]

6 Myriapods are a group of arthropods that are commonly found in soil habitats in many parts of the world. Many myriapods are very small and not easy to identify.

Fig. 6.1 shows four species of myriapod, not drawn to the same scale.



Polydesmus denticulatus | *Cylindroiulus punctatus* | *Scutigera coleoptrata* | *Scolopocryptops sexspinosus*

Fig. 6.1

(a) State **three** features of **all** myriapods that are visible in Fig. 6.1.

1 .....

.....

2 .....

.....

3 .....

..... [3]

(b) Describe **three** features of myriapods that could be used to make a dichotomous key to distinguish between the four species in Fig. 6.1.

1 .....

.....

2 .....

.....

3 .....

..... [3]

(c) Mitochondria are cell structures that contain a small quantity of DNA.

Scientists are sequencing the DNA of one particular gene in mitochondria to help identify different species of many animals including myriapods. The sequences that they find are called 'barcodes'.

(i) State the part of the cell that contains most of the DNA.

..... [1]

(ii) Suggest how DNA barcoding might be useful in the conservation of animals, such as myriapods.

.....

.....

.....

.....

..... [2]

(iii) State the function of DNA in cells.

.....

.....

.....

.....

..... [2]

(d) A student found the following information about the feeding relationships between some organisms in a soil habitat.

Dead organic matter, such as leaves, provides food for bacteria and soil fungi.

Earthworms eat dead leaves.

Many millipedes feed on dead plant matter and also on soil fungi.

Nematodes feed on bacteria and are eaten by springtails.

Centipedes are predators that feed on earthworms, millipedes and springtails.

(i) Draw a food web to show the feeding relationships described above.

[4]

(ii) Describe the roles of the soil organisms in the **carbon** cycle.

.....

.....

.....

.....

..... [2]

[Total: 17]

© UCLES 2014

BLANK PAGE

© UCLES 2014

BLANK PAGE

Permission to reproduce items where third-party owned material protected by copyright is included has been sought and cleared where possible. Every reasonable effort has been made by the publisher (UCLES) to trace copyright holders, but if any items requiring clearance have unwittingly been included, the publisher will be pleased to make amends at the earliest possible opportunity.

Cambridge International Examinations is part of the Cambridge Assessment Group. Cambridge Assessment is the brand name of University of Cambridge Local Examinations Syndicate (UCLES), which is itself a department of the University of Cambridge.

© UCLES 2014