Cambridge
O Level

Cambridge International Examinations
Cambridge Ordinary Level

BIOLOGY **5090/11**

Paper 1 Multiple Choice **October/November 2018**

1 hour

Additional Materials: Multiple Choice Answer Sheet
Soft clean eraser
Soft pencil (type B or HB is recommended)

* 1 7 8 7 7 4 7 2 3 1 *

READ THESE INSTRUCTIONS FIRST

Write in soft pencil.
Do not use staples, paper clips, glue or correction fluid.
Write your name, Centre number and candidate number on the Answer Sheet in the spaces provided unless this has been done for you.
DO **NOT** WRITE IN ANY BARCODES.

There are **forty** questions on this paper. Answer **all** questions. For each question there are four possible answers **A**, **B**, **C** and **D**.
Choose the **one** you consider correct and record your choice in **soft pencil** on the separate Answer Sheet.

Read the instructions on the Answer Sheet very carefully.

Each correct answer will score one mark. A mark will not be deducted for a wrong answer.
Any rough working should be done in this booklet.
Electronic calculators may be used.

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

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CAMBRIDGE
International Examinations

1 Four types of cell found in the leaf of a green plant are listed below.

1 epidermal cells (not including guard cells)

2 guard cells

3 palisade mesophyll cells

4 spongy mesophyll cells

Which cells contain chloroplasts?

A 1, 2, 3 and 4

B 1 and 2 only

C 2, 3 and 4 only

D 2 and 3 only

2 Which statements about osmosis are correct?

1 Glucose molecules can move by osmosis.

2 Molecules pass through a partially permeable membrane.

3 Molecules move down a water potential gradient.

A 1, 2 and 3 **B** 1 and 2 only **C** 1 and 3 only **D** 2 and 3 only

3 A seedling is placed, with its roots, in a solution containing potassium ions and left for 48 hours. The relative concentrations of the potassium ions are shown in the table.

	concentration of potassium ions in the solution	concentration of potassium ions in the root hair
start of experiment	20	15
after 48 hours	18	35

How did the potassium ions enter the cell?

	active transport	diffusion	osmosis
A	✓	✓	✗
B	✓	✓	✓
C	✓	✗	✗
D	✗	✗	✓

key

✓ = yes

✗ = no

4 Enzyme action can be explained by the lock and key hypothesis.

Where is the active site and does the substrate act as the lock or as the key?

	active site on enzyme	active site on substrate	substrate acts as a lock	substrate acts as a key
A	✓	✗	✓	✗
B	✓	✗	✗	✓
C	✗	✓	✓	✗
D	✗	✓	✗	✓

key
✓ = yes
✗ = no

5 Some organisms live at the bottom of the sea where it is very dark. To synthesise glucose, they use energy from chemicals in the very hot water that comes out of volcanoes.

What is a distinguishing feature of these organisms?

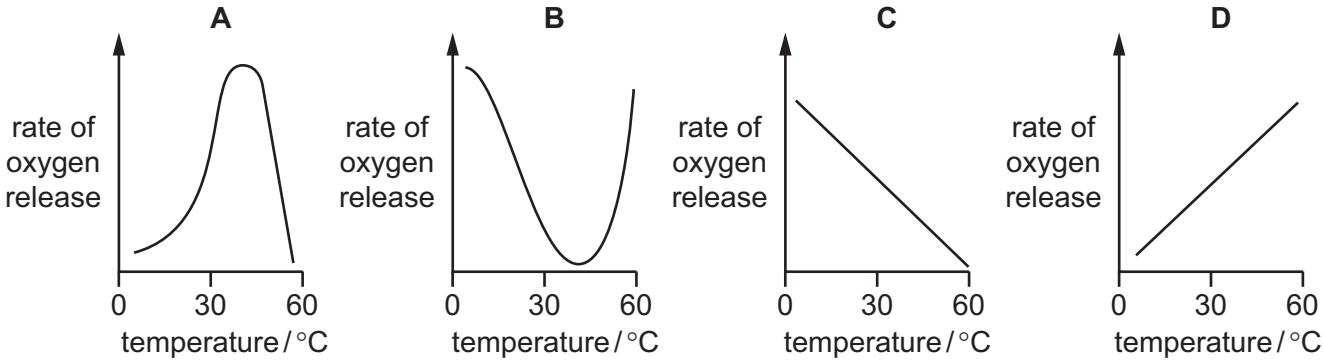
A Their enzymes are easily denatured by heat.

B They do not need carbon dioxide.

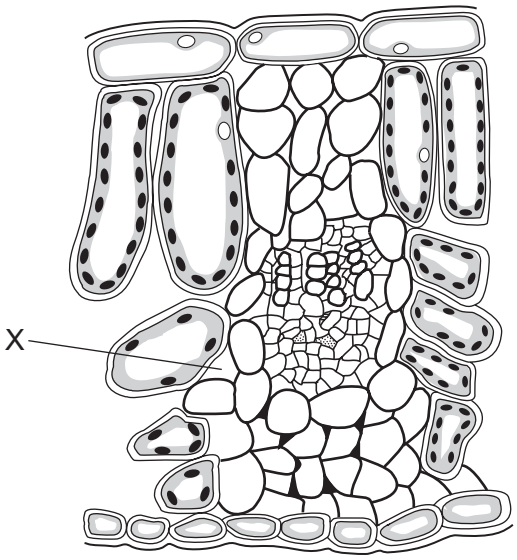
C They do not need to be green.

D They obtain energy only as carnivores.

6 Which graph shows the effect of temperature on the rate of oxygen released by an aquatic plant when placed in strong light?



7 The diagram represents a cross-section of part of a leaf.



How does the oxygen content of the air at X compare to normal atmospheric air when the leaf is in the light and when it is in the dark?

	in the light	in the dark
A	higher	lower
B	higher	the same
C	lower	higher
D	lower	the same

8 What is the main function of the colon?

A It absorbs digested food material.

B It absorbs water.

C It gets rid of undigested food material from the body.

D It produces enzymes to digest food.

9 Which foods can be eaten to prevent scurvy, anaemia and rickets?

	preventing scurvy	preventing anaemia	preventing rickets
A	cheese and milk	oranges and lemons	red meat
B	cheese and milk	red meat	oranges and lemons
C	oranges and lemons	cheese and milk	red meat
D	oranges and lemons	red meat	cheese and milk

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10 A person who has coeliac disease has flattened villi in their ileum. If a person with coeliac disease eats the same quantity and types of food as a disease-free person, they will have lower levels of glucose and amino acids in their hepatic portal vein.

Which row explains this?

	capillaries do not absorb the glucose molecules	the surface area of the ileum is reduced
A	✓	✓
B	✓	✗
C	✗	✓
D	✗	✗

key
✓ = yes
✗ = no

11 What is **least** likely to increase the transpiration rate in a plant?

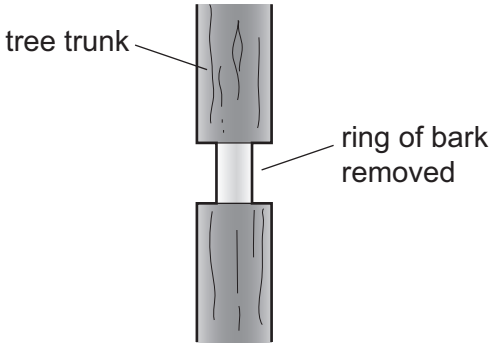
A increased humidity

B increased sunlight

C increased temperature

D increased wind speed

12 The diagram shows part of a tree trunk. A ring of bark including the phloem has been removed.



The tree will eventually die because removing the bark stops the transport of

A mineral salts to the leaves.

B organic nutrients to the roots.

C oxygen to the roots.

D water to the leaves.

13 Which of these organs will receive blood from both an artery **and** a vein?

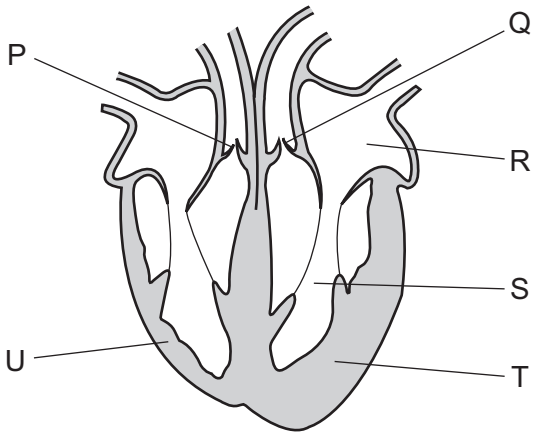
	kidney	liver	lung
A	✓	✓	✗
B	✓	✗	✓
C	✗	✓	✗
D	✗	✗	✓

key

✓ = yes

✗ = no

14 The diagram shows a section through the human heart.



Which suggests that blood leaves the heart at different pressures, when going to the lungs and to the body?

A Chambers R and S have different volumes.

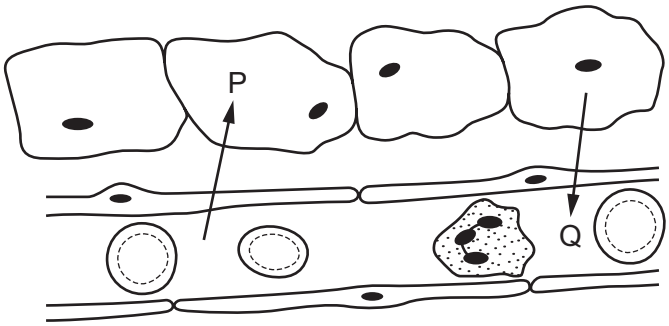
B The walls of the atria are thinner than the walls of the ventricles.

C Valve P is stronger than valve Q.

D Wall T is more muscular than wall U.

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15 The diagram shows chemicals being exchanged between some cells and a blood capillary.



What could be the identities of chemicals P and Q?

	P	Q
A	amino acids and oxygen	carbon dioxide and maltose
B	carbon dioxide and glucose	alcohol and oxygen
C	carbon dioxide and urea	oxygen and protein
D	glucose and oxygen	carbon dioxide and water

16 How many molecules of lactic acid will be produced by the breakdown of two molecules of glucose in anaerobic respiration?

A 2 **B** 4 **C** 6 **D** 12

17 Which process does **not** require energy from respiration?

A converting amino acids into proteins

B diffusion of oxygen into the blood

C keeping the body temperature at 37 °C

D mitosis

18 By which route does oxygen pass into the blood?

A alveoli → capillaries → trachea → bronchioles → bronchi

B bronchi → alveoli → capillaries → trachea → bronchioles

C capillaries → bronchioles → alveoli → bronchi → trachea

D trachea → bronchi → bronchioles → alveoli → capillaries

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19 Which organ excretes most carbon dioxide from the human body?

A kidney

B lung

C rectum

D skin

20 Which structures are **all** involved in controlling human body temperature?

A blood vessels near the skin surface, the cerebellum and sweat glands

B blood vessels near the skin surface, the hypothalamus and skeletal muscles

C kidneys, the cerebellum and sweat glands

D kidneys, the hypothalamus and skeletal muscles

21 What happens to the ciliary muscle and what happens to the lens when the eye focuses on a distant object?

	ciliary muscle	lens
A	contracts	gets thicker
B	contracts	gets thinner
C	relaxes	gets thicker
D	relaxes	gets thinner

22 Which statement about brain structure and function is **not** correct?

A The cerebellum controls balance.

B The cerebrum stores memories.

C The hypothalamus controls movement.

D The medulla controls heart rate.

23 What is **not** an example of a simple reflex action?

A blinking when sand blows in your eyes

B jumping when hearing a loud noise

C removing your hand from a hot object

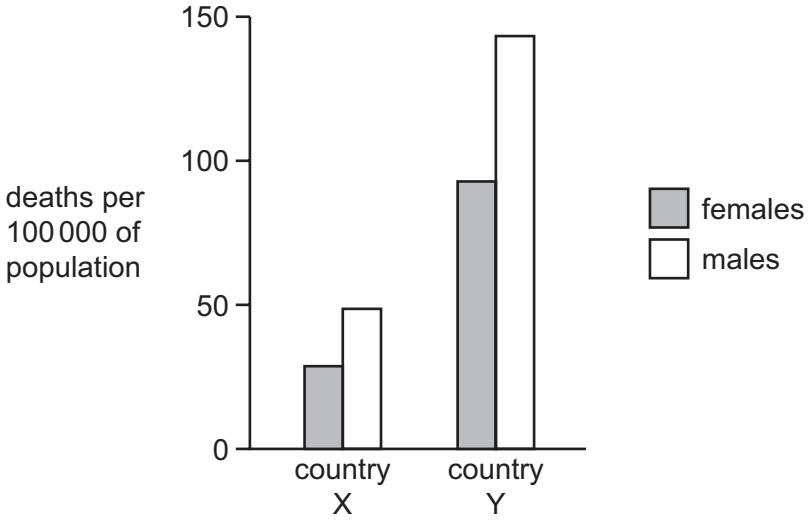
D steering a car to avoid hitting something

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24 Which row shows the type of joint and the type of movement permitted at a joint in the forelimb?

	joint	type of joint	type of movement permitted
A	elbow	ball and socket	movement in one plane
B	elbow	hinge	movement in three planes
C	shoulder	ball and socket	movement in three planes
D	shoulder	hinge	movement in one plane

25 The graph shows the death rates from liver disease in two different countries.



What could explain the difference between the two countries?

A fewer males in country X

B less consumption of fatty foods in country Y

C less drinking of alcohol in country X

D more infectious disease in country Y

26 Which statement is correct for all viruses but **not** for all bacteria and fungi?

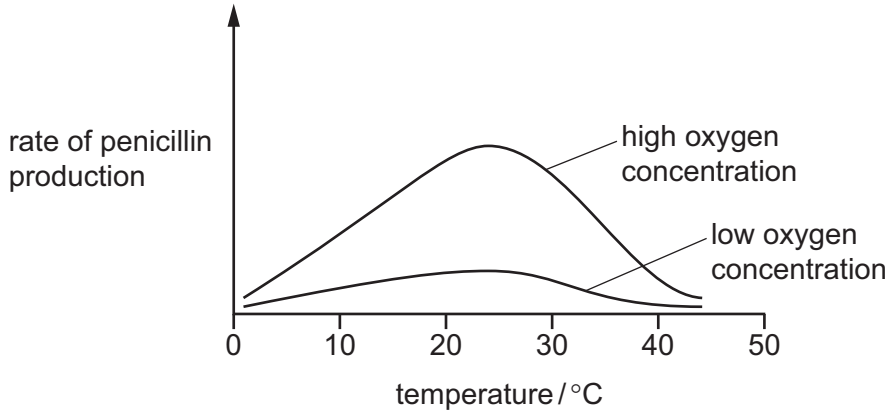
A Most of the cell is cytoplasm.

B Their outer layer is cellulose.

C They are all parasites.

D They have a nucleus containing DNA or RNA.

27 The graph shows how the rate of penicillin production from the fungus *Penicillium* varies with temperature at two different oxygen concentrations.



What can be deduced from the graph?

1 The fungus *Penicillium* respires aerobically.

2 The fungus *Penicillium* respires anaerobically.

3 The optimum temperature for penicillin production is approximately 24 °C.

A 1, 2 and 3 **B** 1 and 2 only **C** 1 and 3 only **D** 2 and 3 only

28 Which organisms **always** obtain their energy from dead organic matter?

A consumers

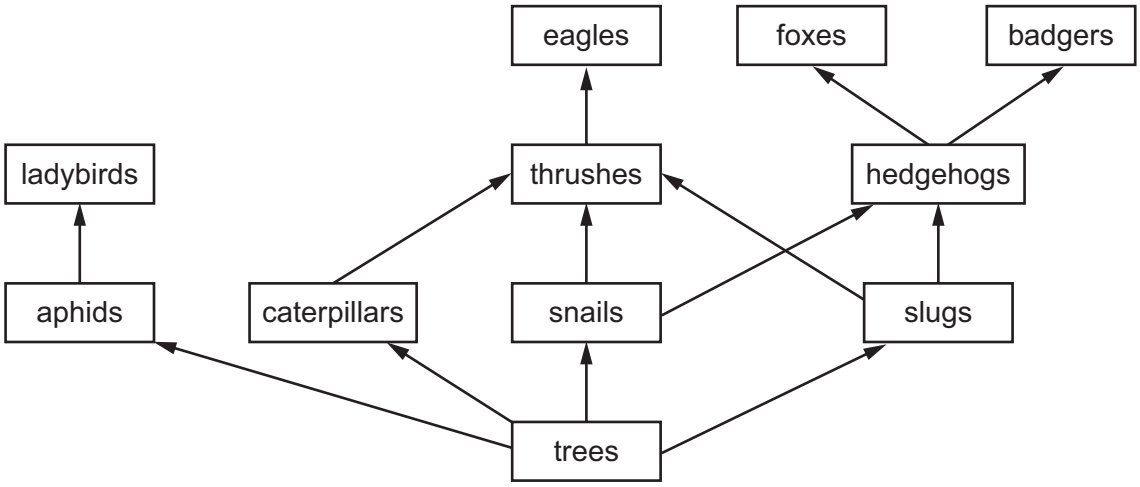
B decomposers

C fungi

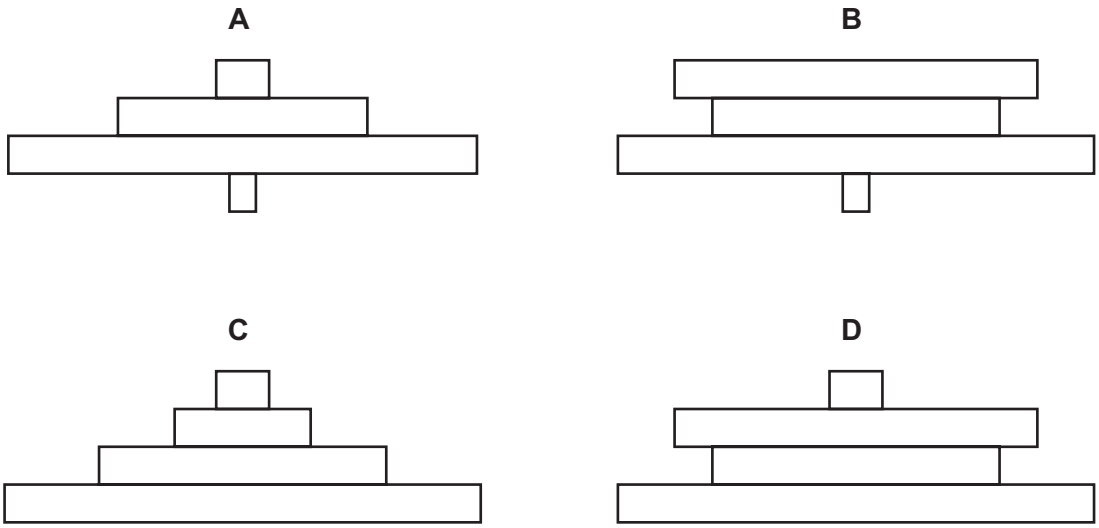
D producers

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29 The diagram shows part of a food web.



Which pyramid of numbers is based on this food web?



30 Which human activity is likely to contribute most to global warming?

A air pollution by acidic gases

B deforestation for agricultural purposes

C emissions from burning fossil fuels

D water pollution by sewage

31 Draining stagnant water is one method of controlling the malarial mosquito.

Which stages in the mosquito life cycle does this method destroy?

A egg, larva, adult

B egg, larva, pupa

C egg, pupa, adult

D larva, pupa, adult

32 In recent years, important rivers in many parts of the world have become more acidic.

What has caused this change?

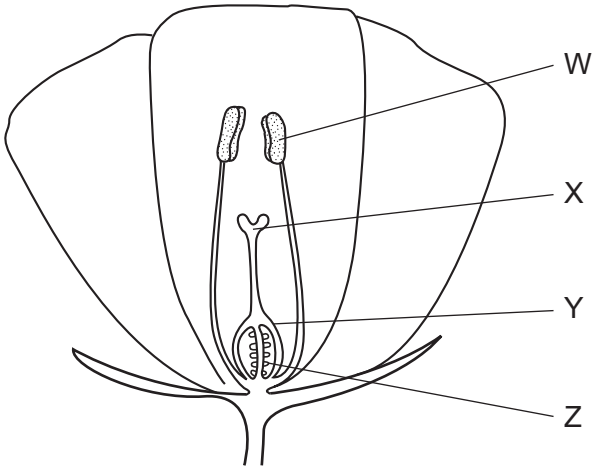
A air pollution by sulfur dioxide

B deforestation

C increased use of insecticides

D increased use of nitrate fertilisers

33 The diagram shows a section through a flower.



What are the names of the labelled structures?

	W	X	Y	Z
A	anther	stigma	ovary	ovule
B	anther	stigma	ovule	ovary
C	stigma	anther	ovary	ovule
D	stigma	anther	ovule	ovary

34 Some seeds are sown in four dishes under different conditions as shown in the table.

In which dish will the seeds germinate most rapidly?

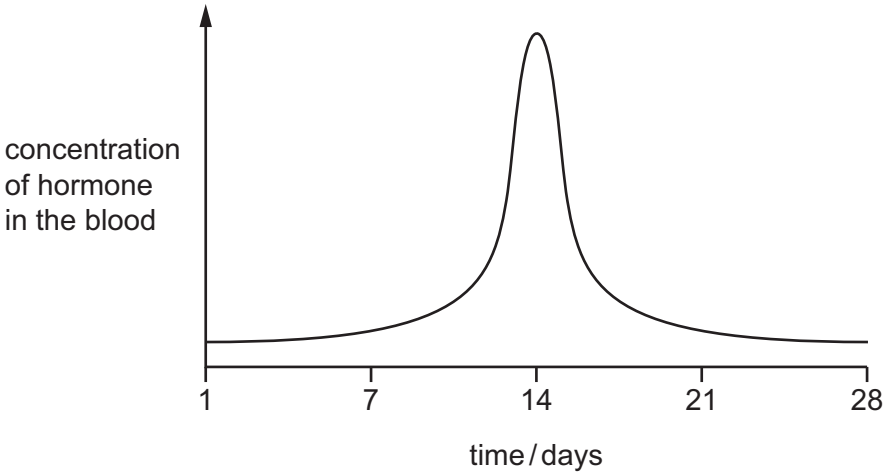
	temperature / °C	wet or dry
A	1	dry
B	1	wet
C	20	dry
D	20	wet

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35 Which row shows a disease and the pathogen that causes it?

	disease	pathogen that causes it
A	AIDS	bacterium
B	AIDS	insect
C	malaria	insect
D	syphilis	bacterium

36 The graph shows the concentration of a hormone in the blood during one menstrual cycle.



Which hormone concentration was measured?

A FSH

B LH

C oestrogen

D progesterone

37 What is the primary function of DNA?

A It controls the absorption of nutrients.

B It controls the production of protein.

C It controls the rate of mutation.

D It controls the rate of reproduction.

38 In the ABO blood group system, which genotype is homozygous dominant?

A $I^A\ I^O$ **B** $I^A\ I^B$ **C** $I^B\ I^B$ **D** $I^O\ I^O$

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39 In a species of plant, the allele for yellow flowers is dominant to the allele for white flowers.

Which offspring is it possible to produce from a cross between two plants heterozygous for flower colour?

A heterozygous yellow and heterozygous white

B heterozygous yellow only

C heterozygous yellow, homozygous yellow and homozygous white

D homozygous yellow only

40 Which statement is correct?

A Evolution is natural selection.

B Evolution results in natural selection.

C Natural selection and evolution are independent of each other.

D Natural selection results in evolution.

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