Cambridge
O Level

Cambridge International Examinations
Cambridge Ordinary Level

BIOLOGY **5090/11**

Paper 1 Multiple Choice **October/November 2017**

1 hour

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

* 6 4 5 4 8 7 4 3 1 9 *

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.

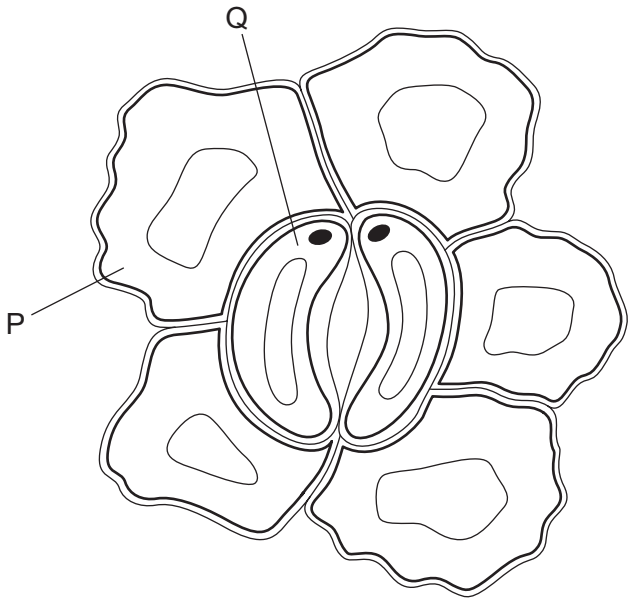
There are **forty** questions on this paper. Answer **all** questions. For each question there are four possible answers **A**, **B**, **C** and **D**.
Choose the **one** you consider correct and record your choice in **soft pencil** on the separate Answer Sheet.

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.

IB17 11_5090_11/3RP
© UCLES 2017

1 The diagram shows cells in the epidermis of a leaf.



To complete the diagram, which structural features should be added to the cells P and Q?

	P		Q	
	chloroplasts	nucleus	chloroplasts	nucleus
A	✓	✓	✗	✗
B	✓	✗	✓	✓
C	✗	✓	✓	✗
D	✗	✗	✗	✓

key
✓ = yes
✗ = no

2 Which movement of a substance in plants is an energy-consuming process?

A absorption of carbon dioxide by a palisade cell

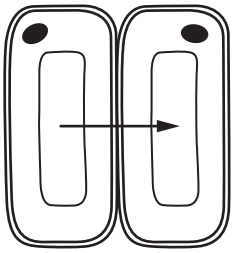
B loss of water into the air spaces of a leaf

C nitrate uptake by root hair cells

D transport of water up through the xylem

© UCLES 2017

3 The diagram shows the direction of water movement from one cell to another in a plant root.



Which cell has the higher water potential, and how does the water move?

	cell with higher water potential	process by which water moves
A	P	active transport
B	P	diffusion and osmosis
C	Q	active transport
D	Q	diffusion and osmosis

4 According to the lock and key hypothesis, what is the lock and what is the key for the enzyme lipase?

	lock	key
A	lipids	fatty acids
B	fatty acids	lipase
C	lipids	lipase
D	lipase	lipids

5 Which characteristic is the result of a deficiency of magnesium in plants?

A large green leaves

B purple spots on leaves

C reduced root growth

D yellow areas between leaf veins

© UCLES 2017

[Turn over

6 When is carbon dioxide absorbed, and when is it released, by an ecosystem such as a tropical rainforest?

	absorbed	released
A	darkness	darkness
B	darkness	daylight
C	daylight	darkness
D	daylight	daylight

7 What describes the upper cuticle of a leaf?

A a permeable layer allowing water to enter the leaf

B a single layer of cells containing many chloroplasts

C a single layer of transparent cells allowing light to enter the leaf

D a thin non-cellular layer preventing water loss from the leaf

8 Which is essential for the healthy growth of teeth in a baby?

A calcium

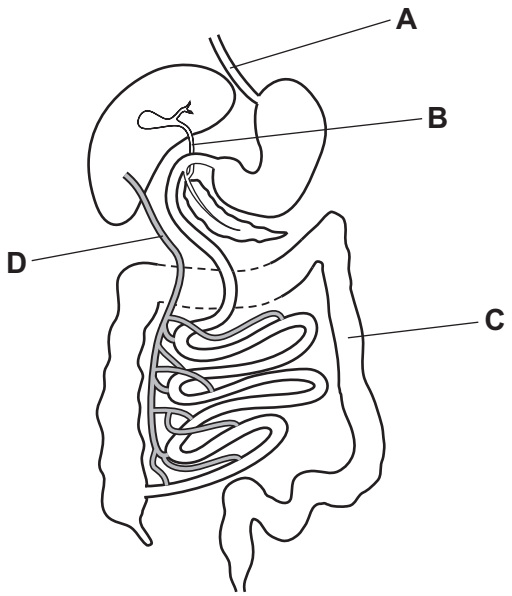
B iron

C nitrate

D urea

9 The diagram shows part of the alimentary canal and associated organs.

Which part would contain high concentrations of glucose and amino acids, four hours after eating a meal?



© UCLES 2017

10 After eating, the pH in the mouth decreases.

Which statement explains this decrease?

A Bacteria release acids.

B Enzymes in saliva release acids.

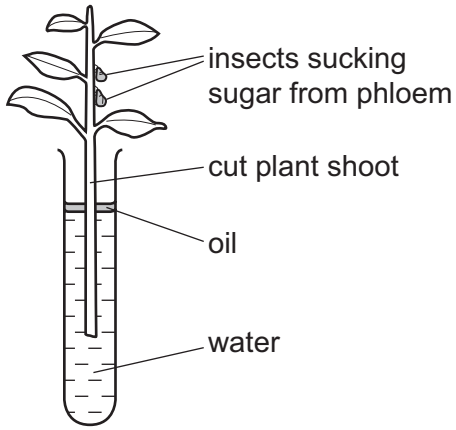
C Salivary glands release acids.

D Sensory neurones in the tongue release acids.

11 Which conditions result in the highest rate of transpiration from a plant?

	percentage humidity	temperature / °C
A	60	15
B	60	25
C	100	15
D	100	25

12 The diagram shows a cut plant shoot in a container of water.



What will stop the movement of water up this stem?

A a fall in the humidity of the air

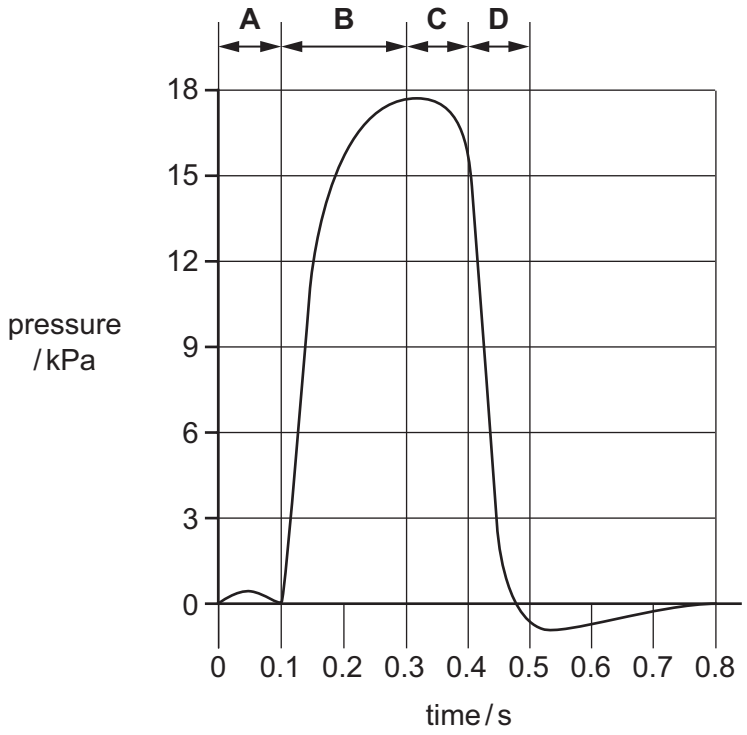
B a rise in the air temperature

C air bubbles in the xylem

D an insect sucking sugar from the phloem

13 The graph shows changes in the blood pressure in the left ventricle of the heart.

During which period is the left **atrium** contracting?

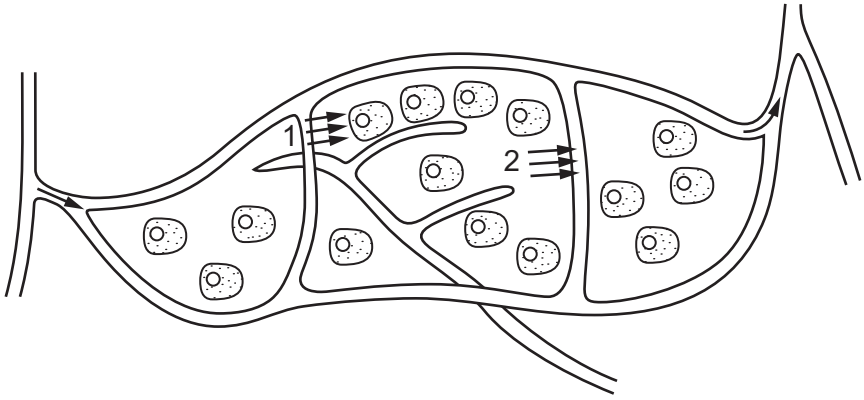


14 What are the effects of the following activities on pulse rate, when compared to resting pulse rate?

	slow walking	fast running
A	decreases	decreases
B	decreases	increases
C	increases	decreases
D	increases	increases

© UCLES 2017

15 The diagram shows capillaries with the direction of movement of materials.



What is happening at points 1 and 2?

	1	2
A	carbon dioxide leaves the blood	urea enters the blood
B	oxygen diffuses	red blood cells return to the blood
C	tissue fluid leaves the capillaries	waste products enter the blood
D	red blood cells move into the tissues	carbon dioxide diffuses

16 Anaerobic respiration takes place when there is a lack of which substance?

A carbon dioxide

B glucose

C lactic acid

D oxygen

17 Which structure is lined with cilia?

A alveolus

B bronchus

C oesophagus

D small intestine

© UCLES 2017

18 Which row shows the state of the muscles when breathing out as deeply as possible?

	diaphragm muscles	external intercostal muscles	internal intercostal muscles
A	contracted	contracted	relaxed
B	contracted	relaxed	contracted
C	relaxed	contracted	relaxed
D	relaxed	relaxed	contracted

19 Men sometimes develop an enlarged prostate gland.

How might this affect urination?

A by blocking the ureter

B by preventing the exit of urine from the bladder

C by stopping the bladder filling with urine

D by stopping urine production in the kidneys

20 What helps heat retention in the human body?

A actively secreting sweat glands

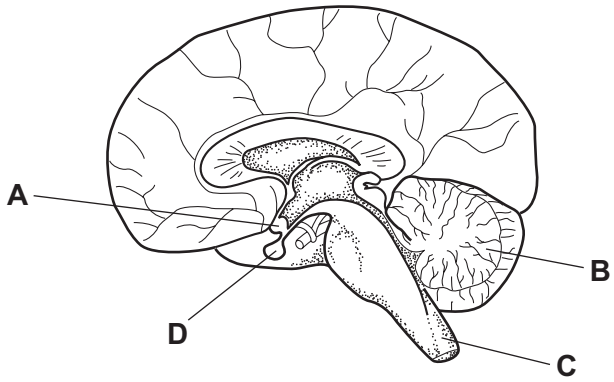
B dilated blood vessels near skin surface

C fat in and under the skin

D relaxed hair erector muscles

21 The diagram shows the brain in vertical section.

Which part is the hypothalamus?



22 Which statements describe the pupil reflex in bright light?

1 ciliary muscles contract
2 ciliary muscles relax
3 circular muscles contract
4 circular muscles relax
5 lens becomes rounder
6 lens becomes thinner
7 pupil constricts
8 pupil dilates
9 radial muscles contract
10 radial muscles relax

A 1, 6 and 9 **B** 2, 5 and 10 **C** 3, 7 and 10 **D** 4, 8 and 9

23 Where are receptors found?

A along the length of all neurones
B at both ends of relay neurones
C at one end of motor neurones
D at one end of sensory neurones

24 Which structure does **not** have its muscles arranged antagonistically?

A the heart ventricle
B the iris
C the oesophagus walls
D the upper arm

© UCLES 2017

25 When a mother smokes during pregnancy, the oxygen supply to the fetus is reduced.

Which row shows how components of tobacco smoke cause this?

	combines with haemoglobin	constricts blood vessels in umbilical cord
A	carbon monoxide	nicotine
B	carbon monoxide	tar
C	tar	carbon monoxide
D	tar	nicotine

26 How do bacteria change milk into yoghurt?

A by producing alcohol

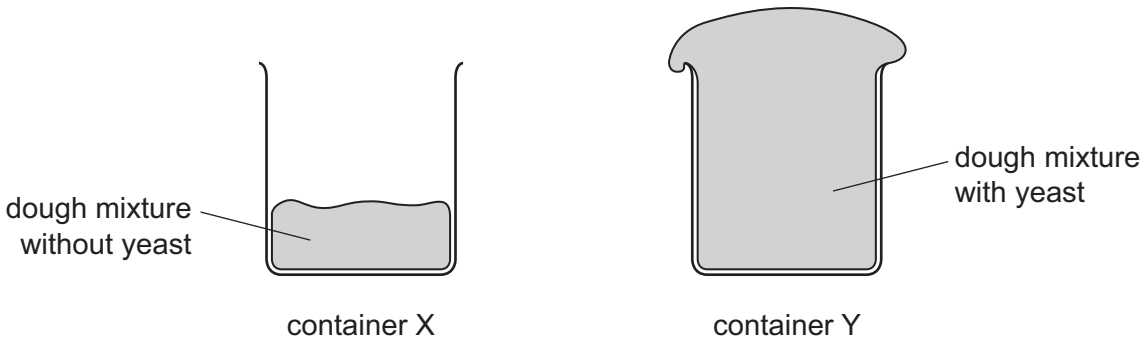
B by producing carbon dioxide

C by producing lactic acid

D by producing oxygen

27 Two containers, X and Y, were filled with equal amounts of dough mixture for making bread. The mixture in Y had yeast in it.

The containers were then left in a warm place for two hours. The diagram shows their appearance after this time.



Which substance produced by the yeast causes the difference between containers X and Y?

A alcohol

B carbon dioxide

C lactic acid

D oxygen

28 Which statement describes relationships in ecosystems?

A Carbohydrates are passed from decomposers to producers.

B Energy is passed from carnivores to herbivores.

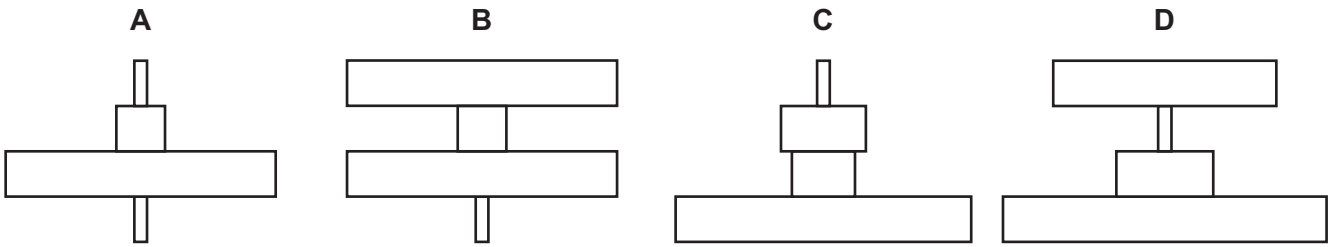
C Proteins are passed from primary consumers to producers.

D Water is passed from respiring decomposers to producers.

29 The diagram shows a food chain.

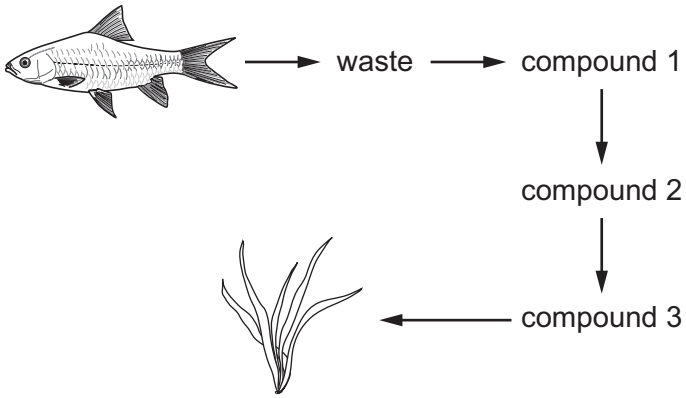
grass → rabbit → fox → flea

Which pyramid of numbers matches this food chain?



30 In a fish tank, bacteria recycle animal waste for plants to use.

The diagram shows some of the stages in this process.



What are compounds 1, 2 and 3?

	1	2	3
A	ammonia	nitrates	nitrites
B	ammonia	nitrites	nitrates
C	nitrates	ammonia	nitrites
D	nitrites	ammonia	nitrates

31 Three statements about malarial parasites are listed.

1 Insecticides are used to kill the vectors.

2 Netting is used to keep the vectors away from people.

3 People take drugs that stop the malarial pathogen developing.

Which methods can be used to control malaria?

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

32 Which is an example of direct action taken to maintain biodiversity?

A culling elephants in a national park following a huge population increase

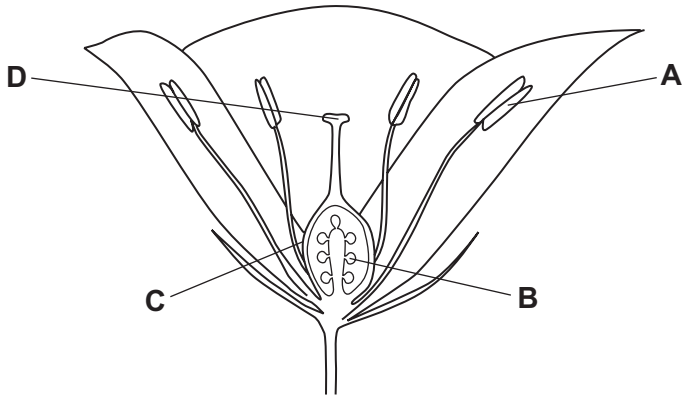
B growing fields of plankton to absorb carbon dioxide

C overseeing the birth of a giant panda cub in a zoo

D researching to discover possible drugs from species found in rainforests

33 The diagram shows the parts of a flower.

Where must pollen land to pollinate the flower?



34 During germination of a seed, which structure is the first to appear above the soil surface?

A plumule

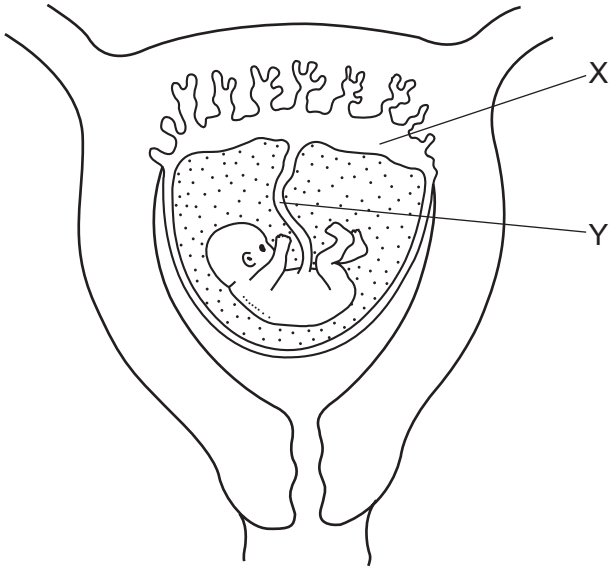
B radicle

C sepal

D testa

© UCLES 2017

35 The diagram shows a fetus in the uterus.



Where is the concentration of oxygen highest?

A an artery at X

B an artery at Y

C a vein at X

D a vein at Y

36 In 2005 there were an estimated 2.3 million HIV-related deaths worldwide. In 2011 there were an estimated 1.7 million HIV-related deaths worldwide.

What is **not** a possible cause for this trend?

A increased access to antiretroviral drugs

B increased screening and heat-treatment of blood and blood products for transfusion

C increased sharing of needles for intravenous drug use

D increased use of condoms for sex

37 A gene is a unit of inheritance that controls the production of

A a chromosome.

B an allele.

C a protein.

D DNA.

38 The gene for insulin production can be removed from human pancreatic cells and added to the genetic material of a harmless bacterium.

What would be the next stage in using this process to treat diabetes?

A Add the altered bacterium to human food.

B Inject the altered bacterium into the blood of a person with diabetes.

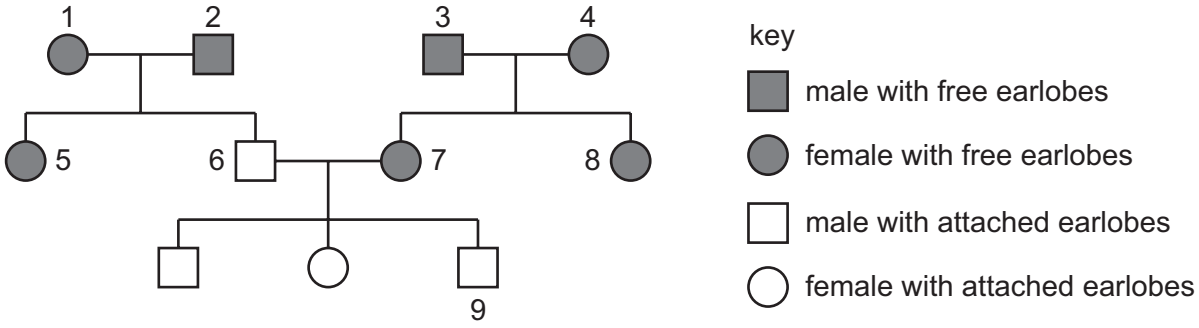
C Put the bacterium into a fermenter to multiply rapidly.

D Use the altered bacterium in a nasal spray.

39 Earlobes can either be attached to the cheek or 'free' (unattached). This characteristic is controlled by a single gene.

The allele for attached earlobes is recessive.

The diagram shows the inheritance of earlobe attachment in one family.



Which two individuals **must** be heterozygous for earlobe attachment?

A 1 and 7 **B** 3 and 4 **C** 5 and 8 **D** 6 and 9

40 The table shows the genotypes and phenotypes for hair colour for the members of a family, but **one** phenotype is shown incorrectly.

	genotype		phenotype
family member	allele 1	allele 2	hair colour
mother	a	A	brown
father	A	A	brown
son 1	a	A	blonde
daughter 1	a	a	blonde
son 2	A	A	brown
daughter 2	A	a	brown

Which family member has the **incorrect** phenotype?

A daughter 1

B daughter 2

C son 1

D son 2

© UCLES 2017

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.

To avoid the issue of disclosure of answer-related information to candidates, all copyright acknowledgements are reproduced online in the Cambridge International Examinations Copyright Acknowledgements Booklet. This is produced for each series of examinations and is freely available to download at www.cie.org.uk after the live examination series.

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.