Cambridge
O Level

Cambridge International Examinations
Cambridge Ordinary Level

BIOLOGY **5090/12**

Paper 1 Multiple Choice **May/June 2017**

1 hour

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

* 9 6 3 0 8 0 8 5 4 7 7 *

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.

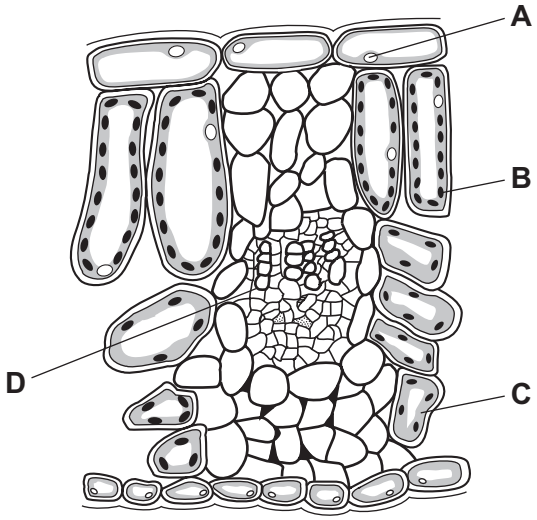
Read the instructions on the Answer Sheet very carefully.

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 06_5090_12/3RP
© UCLES 2017

1 The diagram shows cells from a plant leaf.

Which structure contains a high concentration of magnesium?



2 Which statements about diffusion are correct?

1 Molecules move at random.

2 Molecules move down a concentration gradient.

3 Molecules may move through a partially permeable membrane.

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

3 Which row defines active transport?

	cell membrane needed	movement of ions	respiration needed
A	no	down a concentration gradient	yes
B	no	up a concentration gradient	no
C	yes	down a concentration gradient	no
D	yes	up a concentration gradient	yes

4 Which property of enzymes is explained by the lock and key hypothesis?

A All enzymes are proteins.

B Enzymes are inactive at very low temperatures.

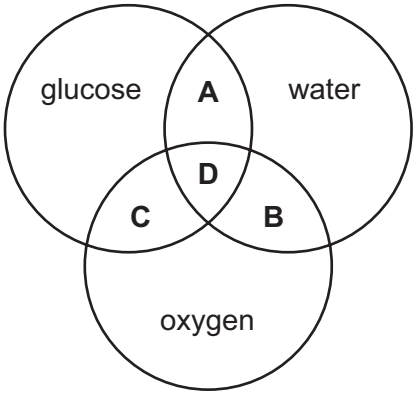
C Human enzymes are most active just below 40 °C.

D Most enzymes can only catalyse one reaction.

© UCLES 2017

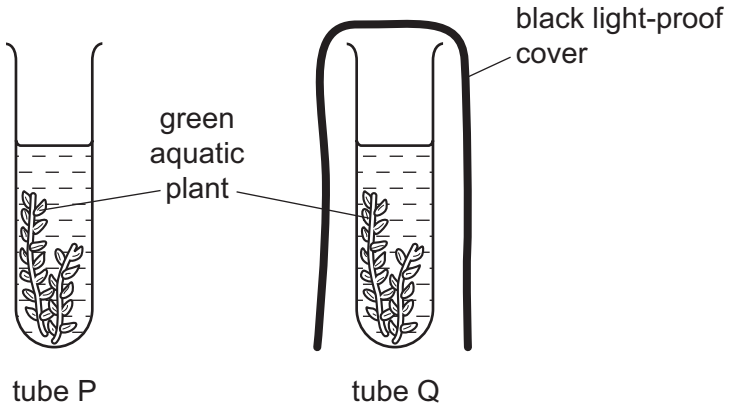
5 The diagram refers to some substances found in plant cells.

Which area of the diagram represents the end products of photosynthesis?



6 Two test-tubes, P and Q, were set up, each containing a solution of red hydrogencarbonate indicator. Hydrogencarbonate indicator turns yellow when the carbon dioxide concentration increases and turns purple when the carbon dioxide concentration decreases.

Similar pieces of the same aquatic plant were placed into tubes P and Q. Tube P was uncovered, tube Q had a black light-proof cover. The tubes were left in a warm room in sunlight for four hours.



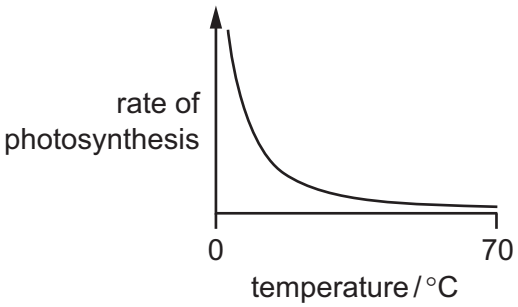
What would be the colour of the hydrogencarbonate indicator in the two tubes after four hours?

	tube P	tube Q
A	purple	red
B	purple	yellow
C	red	yellow
D	yellow	red

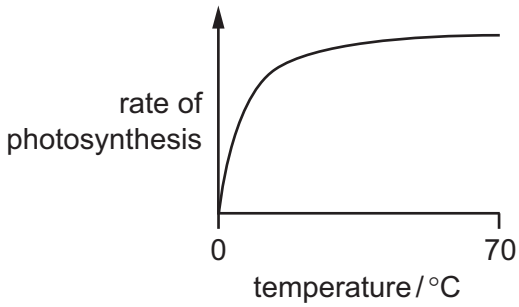
© UCLES 2017

7 Which graph shows the effect of temperature on the rate of photosynthesis?

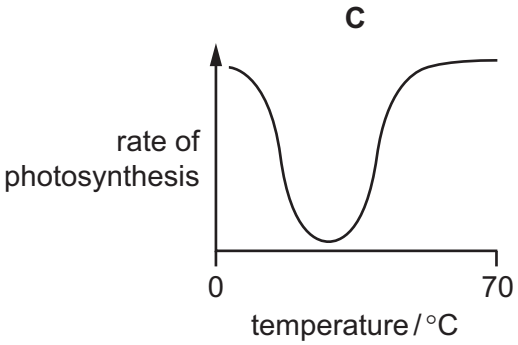
A



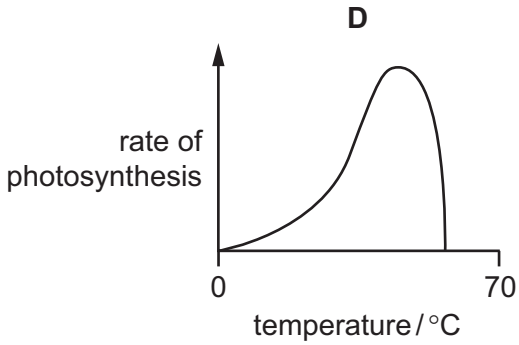
B



C



D



8 Which symptom of malnutrition can be treated by an increased amount of protein in the diet?

A constipation

B heart disease

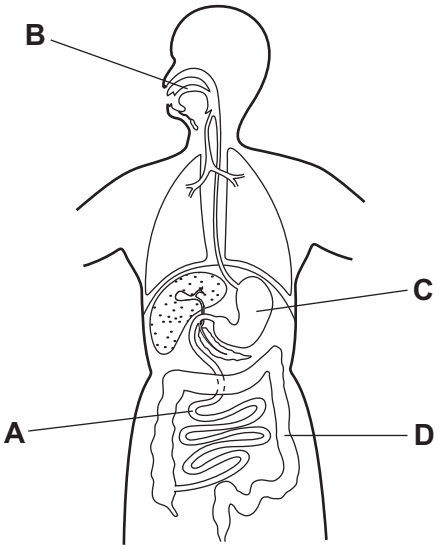
C obesity

D stunted growth

© UCLES 2017

9 The diagram shows the human alimentary canal.

In which part does protein digestion begin?



10 In which blood vessel does the concentration of glucose vary the most?

A aorta

B hepatic artery

C hepatic portal vein

D vena cava

11 Which feature of root hairs suggests that they take up ions from the soil by active transport?

A Their cell membranes are partially permeable.

B They have a large surface area.

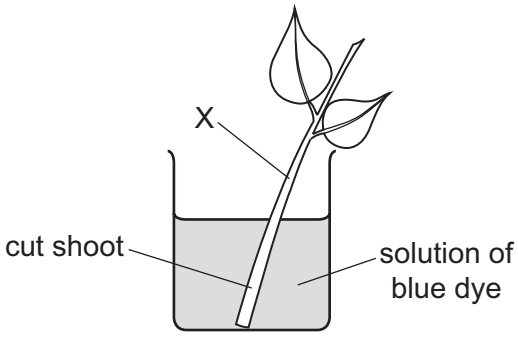
C They have a lower water potential than the soil.

D They take up ions more slowly in low oxygen concentrations.

© UCLES 2017

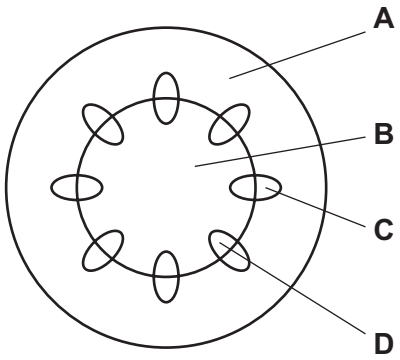
[Turn over

12 The cut shoot of a plant is placed in a beaker containing a solution of blue dye for one hour, as shown.



The stem of the shoot is then cut through at X, and examined under a microscope.

In which region of the stem is the blue dye most concentrated?



13 Why is a rise in pulse rate important for an athlete during a 200 m race?

A to increase the digestion of carbohydrates

B to increase ventilation of the lungs with fresh air

C to reduce the need for anaerobic respiration

D to reduce the need for sweating to cool the body

14 Which row shows what may cause coronary heart disease?

	diet high in saturated fats	diet low in salt	regular exercise
A	✓	✓	✗
B	✓	✗	✗
C	✗	✓	✓
D	✗	✗	✓

key
✓ = yes
✗ = no

15 What is a difference between plasma and tissue fluid?

	plasma	tissue fluid
A	dissolved glucose	no dissolved glucose
B	less dissolved glucose	more dissolved glucose
C	more protein molecules	fewer protein molecules
D	no white blood cells	white blood cells

16 What lines the walls of alveoli?

A a carpet of cilia

B a film of moisture

C a network of veins

D a thin sheet of muscle

17 Which substances are produced during aerobic respiration?

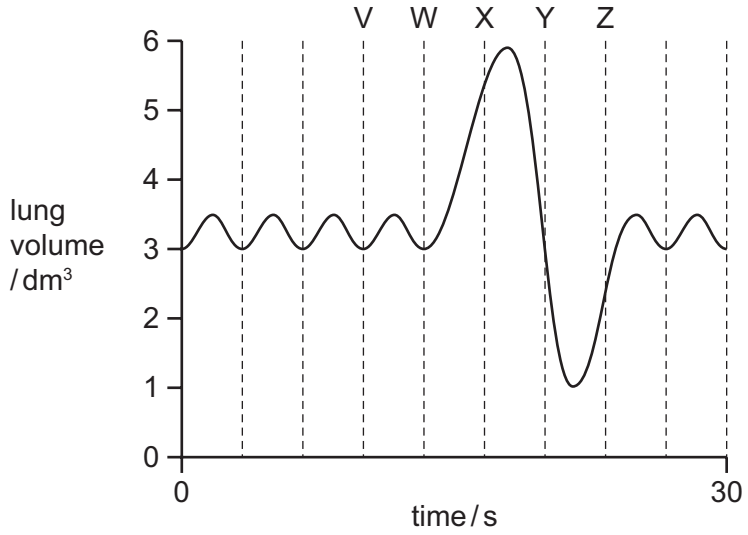
A alcohol and carbon dioxide

B carbon dioxide and water

C glucose and lactic acid

D lactic acid and water

18 The graph shows changes in the amount of air in a person's lungs over a period of 30 seconds.

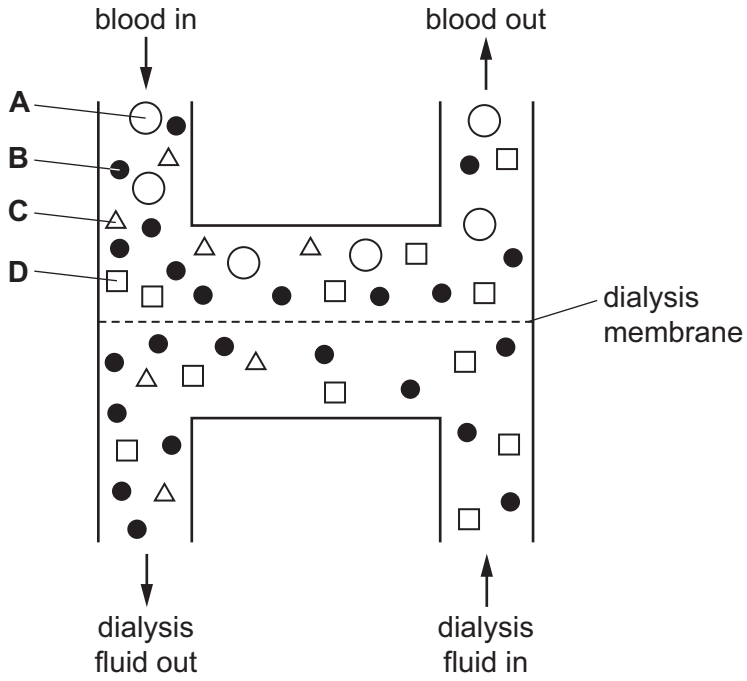


In which time period is the rate of breathing **fastest**?

A V to W **B** W to X **C** X to Y **D** Y to Z

19 The diagram represents dialysis in a kidney machine. Each shape represents a molecule found in blood or dialysis fluid.

Which shape represents protein?



20 Which parts of the skin are involved in the control of body temperature?

	sweat glands	temperature receptors	blood vessels
A	✓	✓	✓
B	✓	✓	✗
C	✓	✗	✓
D	✗	✓	✓

key
✓ = yes
✗ = no

21 Which structures does light pass through when it is focused on the retina?

	cornea	lens	sclera
A	✓	✓	✓
B	✓	✓	✗
C	✓	✗	✓
D	✗	✓	✓

key
✓ = yes
✗ = no

© UCLES 2017

22 Which row shows what causes adrenaline or insulin to be released, and the effect of this hormone on blood glucose concentration?

	hormone	when released into blood	effect on blood glucose concentration
A	adrenaline	after meals	decreases
B	adrenaline	when anxious	increases
C	insulin	after meals	increases
D	insulin	when fasting	decreases

23 A man suffers a head injury and his cerebellum is damaged.

What is the result of this?

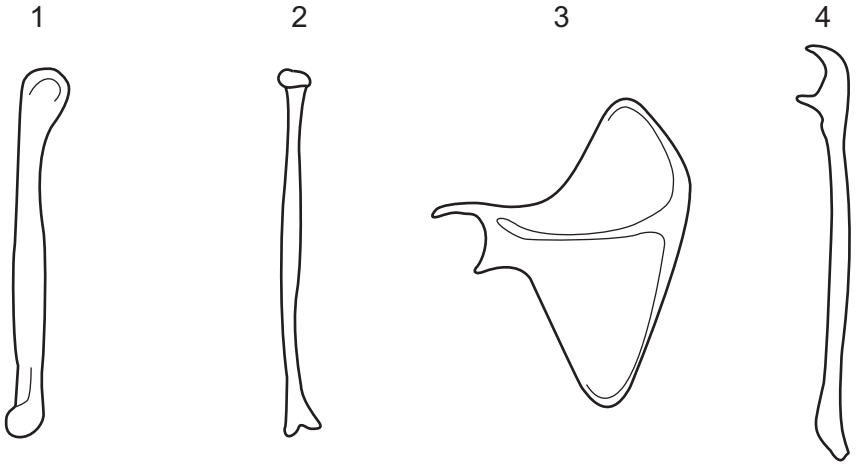
A inability to recognise visual stimuli

B irregular heartbeat

C lack of temperature control

D poor coordination of movements

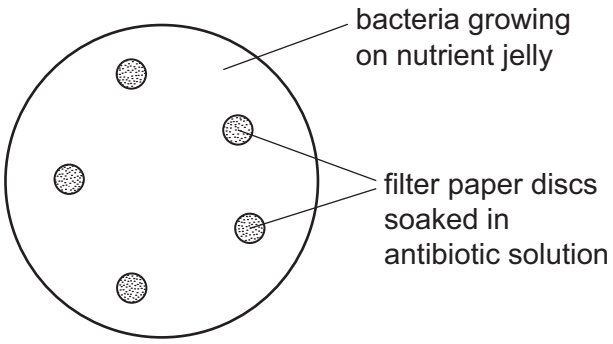
24 The diagram shows four bones associated with the forelimb.



Which bones form a hinge joint?

A 1, 2 and 3 **B** 1, 2 and 4 **C** 2 and 3 **D** 3 and 4

25 An experiment is set up as shown in the diagram, to compare how well different antibiotics work against a species of bacterium.



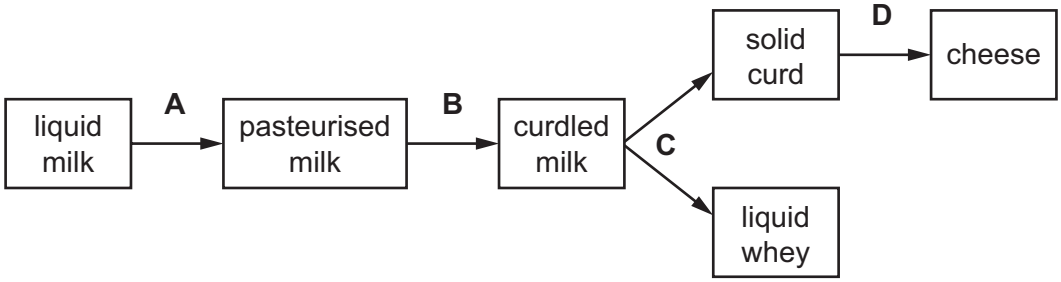
In this experiment, which conditions must be kept constant?

	concentration of antibiotic	size of filter paper discs	type of antibiotic
A	✓	✓	✗
B	✓	✗	✗
C	✗	✓	✓
D	✗	✗	✓

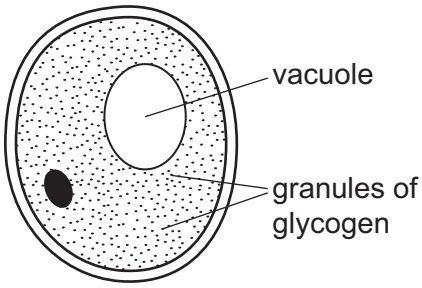
key
✓ = yes
✗ = no

26 The diagram shows processes in the production of cheese.

In which process is there a significant reduction in pH?



27 The diagram shows a cell and some of its features.



From where has this cell been taken?

A a fermenting alcoholic drink

B pus from a syphilitic sore

C the liver of an animal

D the mesophyll of a leaf

28 Why does an ecosystem need to be exposed regularly to sunlight?

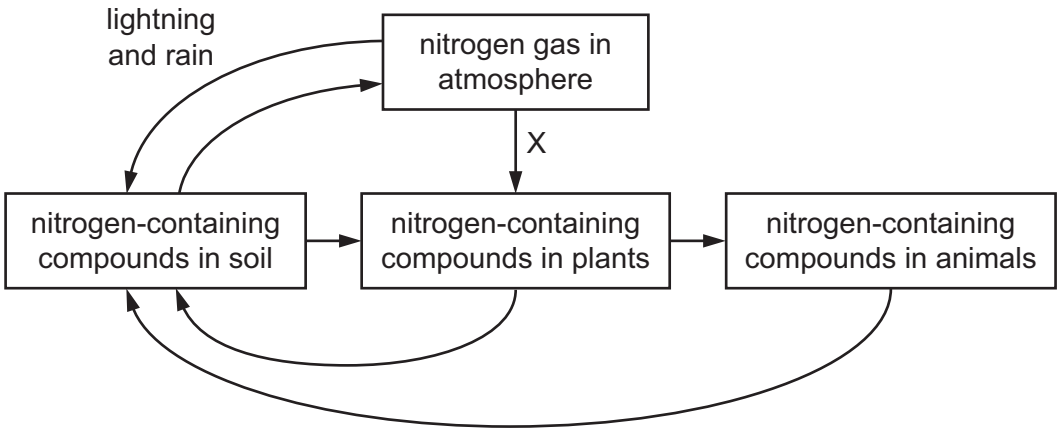
A Energy is converted to biomass.

B Energy is lost as heat.

C Energy is lost to decomposers.

D Energy is reflected by plants.

29 The diagram shows part of the nitrogen cycle.



Which process occurs at X?

A decomposition

B denitrification

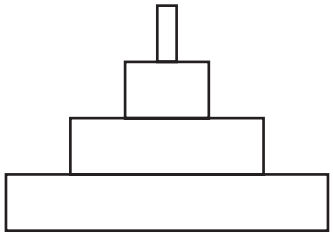
C nitrification

D nitrogen fixation

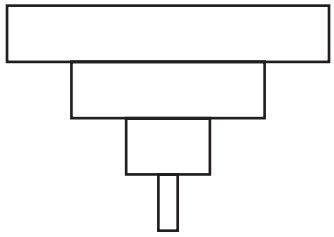
30 Insects feed on a tree's leaves. The insects are eaten by small birds that are the prey of larger birds.

Which pyramid of numbers illustrates this food chain?

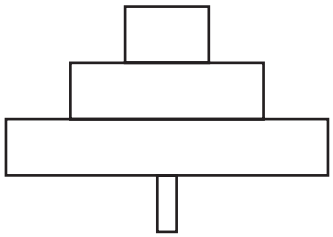
A



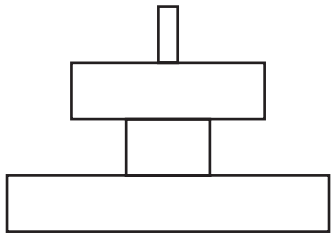
B



C



D



31 Which row correctly matches a method of controlling malaria with the explanation of how this method works?

	method	explanation
A	covering windows with netting	kills mosquitoes
B	spraying oil on rivers	kills mosquito larvae
C	taking anti-malarial tablets	stops mosquitoes biting
D	using insecticides	kills malarial parasites

32 Which plants are most likely to adapt successfully to a climate change in their environment?

A plants that are cross-pollinated

B plants that do not rely on wind-pollination

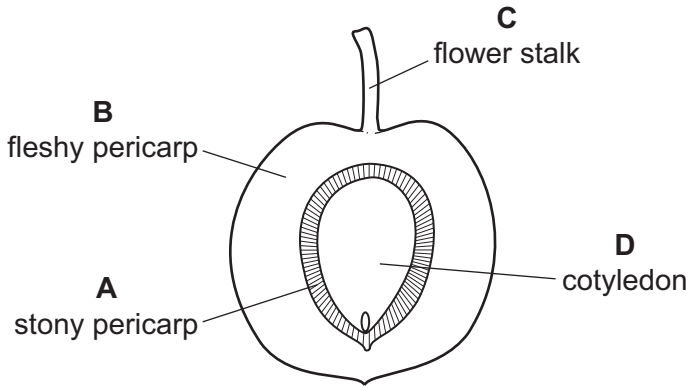
C plants that grow rapidly

D plants that reproduce asexually

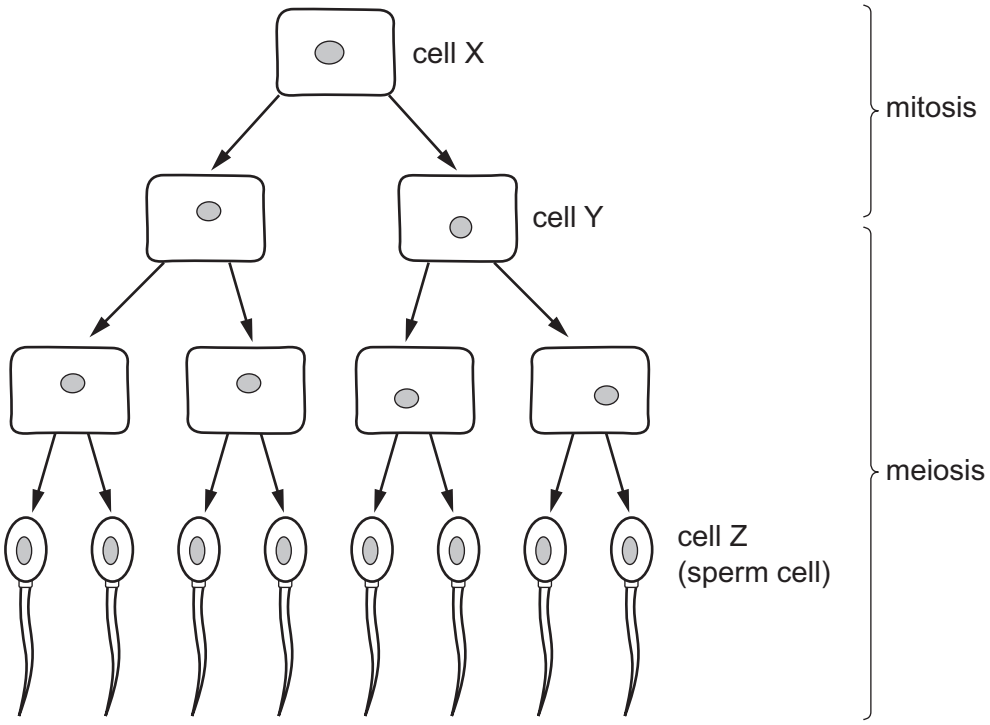
© UCLES 2017

33 The diagram shows a section through a plum fruit.

Which structure has a genotype different to the other three?



34 The diagram shows some stages in cell division in a fruit fly.



Cell X contains 8 chromosomes.

How many chromosomes are in cell Y and in cell Z?

	cell Y	cell Z
A	4	4
B	4	8
C	8	4
D	8	8

© UCLES 2017

[Turn over

35 What is the path taken by sperm cells during ejaculation from the male reproductive system?

A sperm duct → testis → urethra

B sperm duct → urethra → testis

C testis → sperm duct → urethra

D testis → urethra → sperm duct

36 Which method of birth control gives some protection from syphilis and HIV?

A condom

B diaphragm (cap)

C intra-uterine device (IUD)

D vasectomy

37 What is essential for natural selection to occur?

	competition	variation
A	✓	✓
B	✓	✗
C	✗	✓
D	✗	✗

key

✓ = yes

✗ = no

38 Insulin is manufactured commercially using genetic engineering.

Which type of organism is used to produce large quantities of insulin in this way?

A animals

B bacteria

C fungi

D viruses

39 Which statement about chromosomes is correct?

A A chromosome is part of a DNA molecule.

B A chromosome carries a long molecule of DNA.

C Each chromosome controls the inheritance of one body feature.

D Genes are made up of a chain of chromosomes.

© UCLES 2017

40 In fruit flies, the allele for an ebony coloured body is recessive to the allele for a grey coloured body. In an investigation, an ebony-bodied fly is crossed with a grey-bodied fly.

What will be the body colour of the offspring if the grey-bodied fly is heterozygous?

A all ebony

B all grey

C half ebony and half grey

D three-quarters grey and one-quarter ebony

© 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.

© UCLES 2017