Cambridge
O Level

Cambridge International Examinations
Cambridge Ordinary Level

BIOLOGY **5090/11**

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)

* 1 2 7 3 6 8 9 4 5 6 *

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.

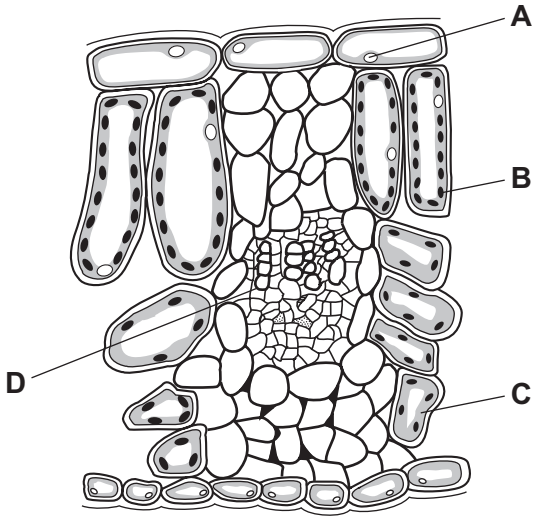
Read the instructions on the Answer Sheet very carefully.

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.

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1 The diagram shows cells from a plant leaf.

Which structure contains a high concentration of magnesium?



2 Which of these processes will always occur down a concentration gradient?

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

key
✓ = yes
✗ = no

3 A student cuts out four cylinders of potato. Each cylinder is 30 mm long. The cylinders are all of the same diameter.

The potato cylinders are placed in sugar solutions of different concentrations. After one hour, the lengths of the cylinders are measured again. The results are shown in the table.

Which sugar solution has a water potential closest to that of the potato cells?

	concentration of sugar / mol per dm^3	starting length / mm	length after one hour / mm
A	0.1	30	33
B	0.3	30	31
C	0.4	30	27
D	0.5	30	26

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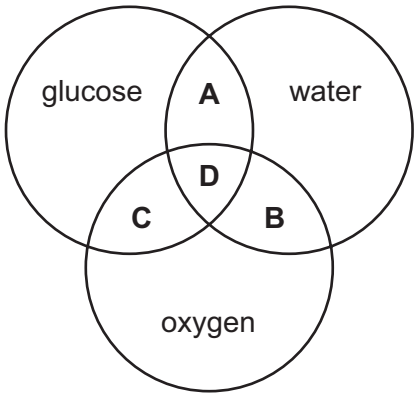
4 Which are properties of enzymes?

	reusable many times	specific in their action	unaffected by temperature
A	✓	✓	✗
B	✗	✗	✗
C	✓	✗	✓
D	✗	✓	✓

key
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✗ = no

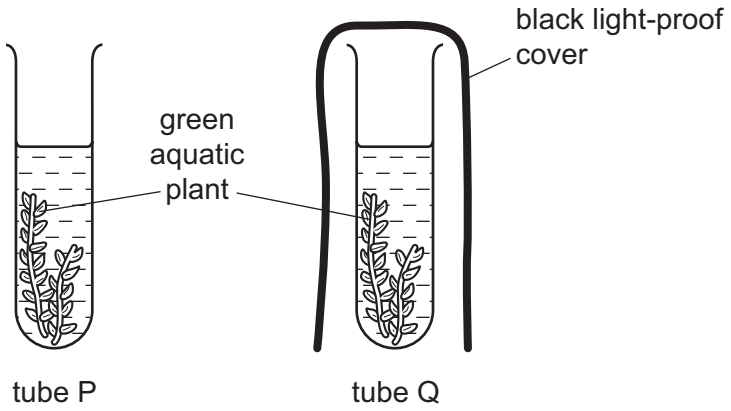
5 The diagram refers to some substances found in plant cells.

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.

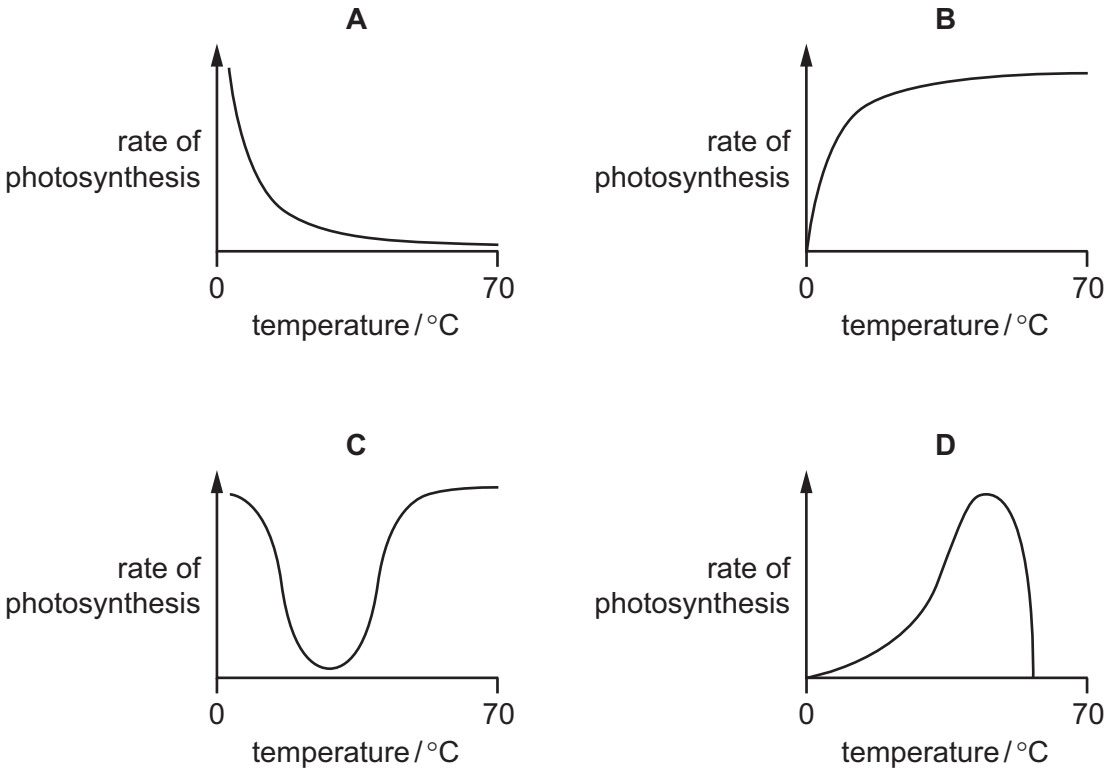


What would be the colour of the hydrogencarbonate indicator in the two tubes after four hours?

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

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



8 Some people wear clothing that covers large areas of their skin. They are at risk of a dietary deficiency disease where sunlight is in short supply.

Which nutrient do they lack?

A calcium

B iron

C vitamin C

D vitamin D

9 Which is **not** a function of the liver?

A conversion of glucose to glycogen

B storage of glycogen

C secretion of insulin

D synthesis of proteins from amino acids

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[Turn over

10 A person has a blockage in their bile duct.

What will be a result of this?

A increased concentration of glucose in the blood

B increased concentration of urea in the blood

C slower digestion of fats

D slower digestion of starch

11 Water and ions can reach the xylem of a plant root through cell walls, without passing through a cell membrane.

How do these substances move through the cell walls?

	water	ions
A	diffusion	diffusion
B	diffusion	osmosis
C	osmosis	diffusion
D	osmosis	osmosis

12 An area of grassland becomes flooded with sea-water.

Sea-water contains a high concentration of salt.

What is the effect of the sea-water on the functions of the root hairs?

	uptake of ions by root hairs	uptake of water by root hairs
A	no longer occurs	no longer occurs
B	no longer occurs	still occurs
C	still occurs	no longer occurs
D	still occurs	still occurs

13 Which chamber of the heart has the thickest walls?

A left atrium

B left ventricle

C right atrium

D right ventricle

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14 Which row shows the blood pressures in an artery, a capillary and a vein?

	pressure / kPa		
	artery	capillary	vein
A	0.6	4.0	13.0
B	4.0	0.6	13.0
C	13.0	0.6	4.0
D	13.0	4.0	0.6

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 Which changes occur in the diaphragm and intercostal muscles when a person breathes in?

	diaphragm	external intercostal muscles	internal intercostal muscles
A	contracts	contract	relax
B	contracts	relax	contract
C	relaxes	contract	relax
D	relaxes	relax	contract

17 Which is produced during anaerobic respiration in muscles?

A alcohol, carbon dioxide and water

B carbon dioxide and lactic acid

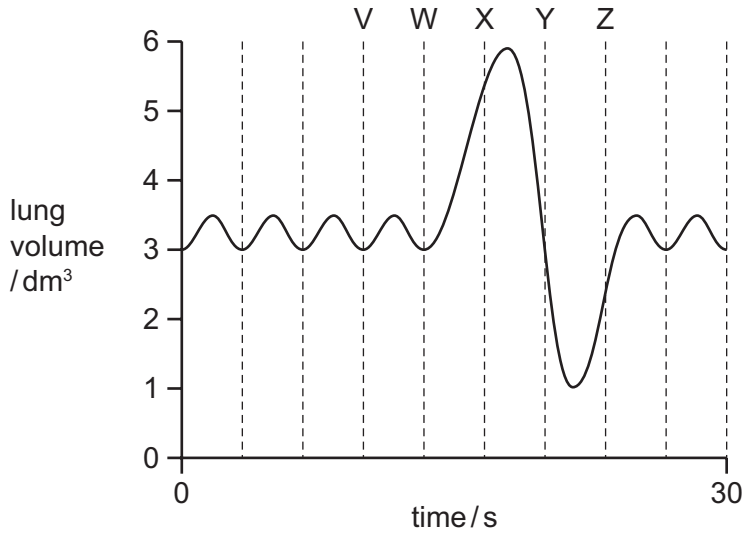
C carbon dioxide only

D lactic acid only

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[Turn over

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 An analysis of the composition of expired air is shown.

gas in expired air	% of expired air
carbon dioxide	4.1
oxygen	16.4
nitrogen and other gases	79.5

Using only data from the table, what percentage of the expired air is excreted material?

A 0% **B** 4.1% **C** 83.6% **D** 100%

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

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21 A person looks at some hills far away.

Which row shows the state of the lenses, ciliary muscles and suspensory ligaments in her eyes?

	thick lenses	contracted ciliary muscles	suspensory ligaments under tension
A	✓	✓	✓
B	✓	✗	✗
C	✗	✓	✗
D	✗	✗	✓

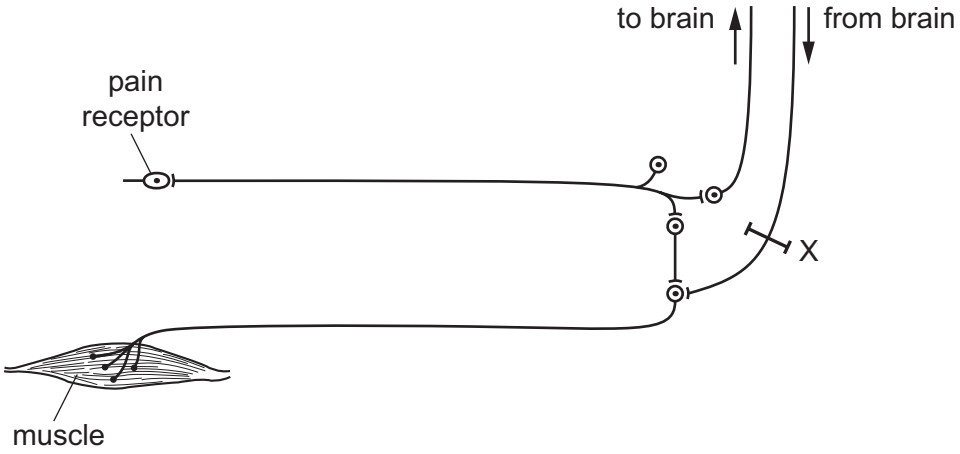
key
✓ = yes
✗ = no

22 What are characteristics of hormones?

	affect target organs	carried by the blood	produced by glands
A	✓	✓	✓
B	✓	✓	✗
C	✓	✗	✓
D	✗	✓	✓

key
✓ = yes
✗ = no

23 The diagram shows some of the nerve pathways associated with a reflex action.



If the pathway at X is damaged, how does this affect the reflex?

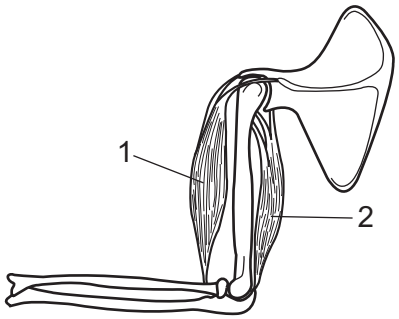
A The person will not be aware that the reflex is occurring.

B The reflex cannot be controlled consciously.

C The response will occur without any stimulus.

D There is no response to the stimulus.

24 The diagram shows some of the bones and muscles in a human arm.



Which is a correct description of the changes that cause the forearm to be raised?

A The biceps muscle at 1 contracts.

B The biceps muscle at 2 contracts.

C The triceps muscle at 1 contracts.

D The triceps muscle at 2 contracts.

25 Which of these diseases can be treated effectively with antibiotics?

1 HIV

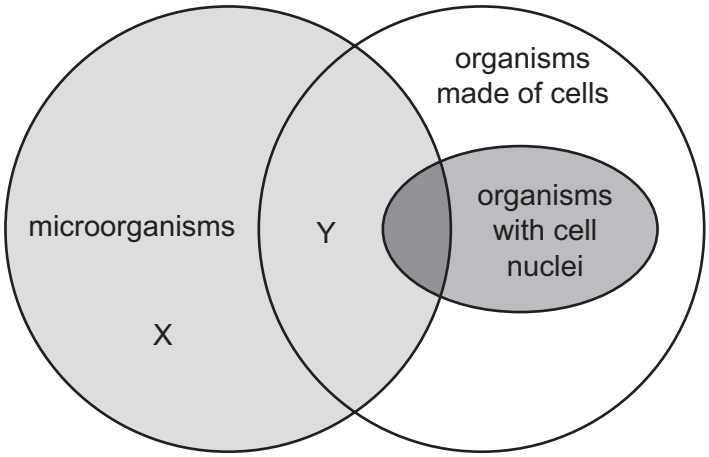
2 malaria

3 syphilis

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

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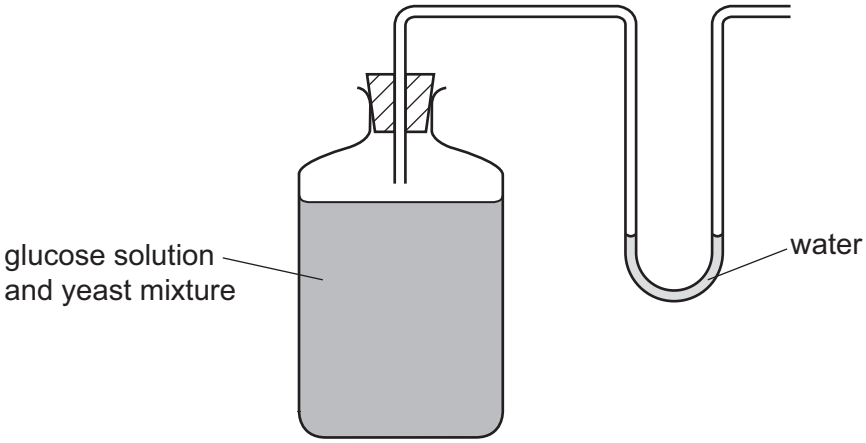
26 The diagram shows some characteristics of different organisms.



What do areas X and Y represent?

	X	Y
A	bacteria	fungi
B	bacteria	viruses
C	fungi	viruses
D	viruses	bacteria

27 The diagram shows a simple apparatus that could be used to produce alcohol.



What is the role of the U-shaped tube containing water?

A to keep bacteria in and oxygen in

B to keep bacteria in and oxygen out

C to keep bacteria out and oxygen in

D to keep bacteria out and oxygen out

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.

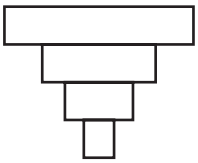
D Energy is reflected by plants.

29 The diagram shows a food chain.

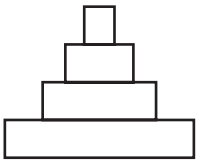
tree → mice → cats → fleas

What is the shape of the pyramid of numbers for this food chain?

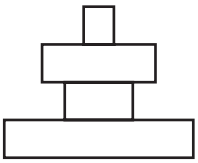
A



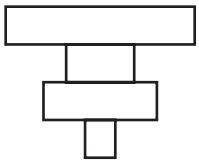
B



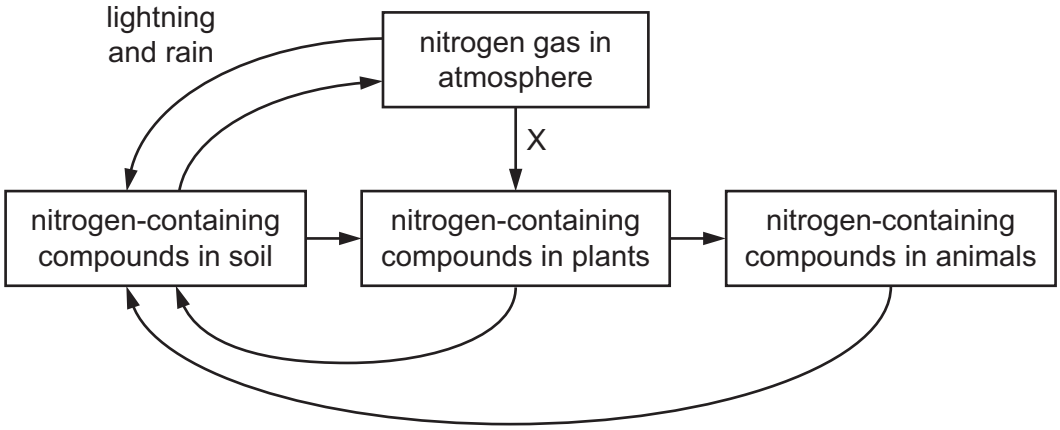
C



D



30 The diagram shows part of the nitrogen cycle.



Which process occurs at X?

A decomposition

B denitrification

C nitrification

D nitrogen fixation

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31 Which row shows the malarial parasite and the vector involved in its transmission?

	parasite	vector
A	female mosquito	human
B	human	male mosquito
C	malarial pathogen	female mosquito
D	male mosquito	malarial pathogen

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

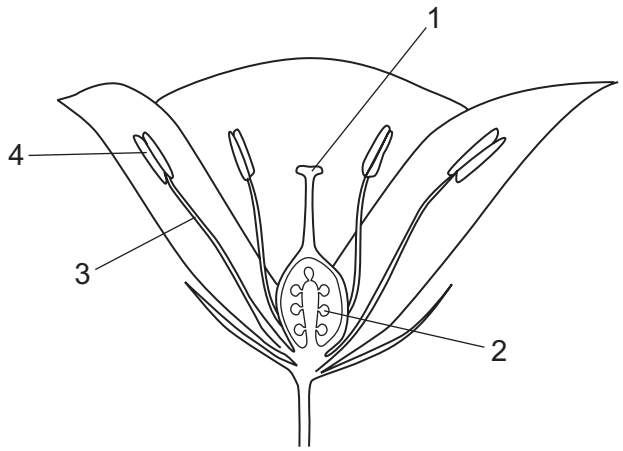
A plants that are cross-pollinated

B plants that do not rely on wind-pollination

C plants that grow rapidly

D plants that reproduce asexually

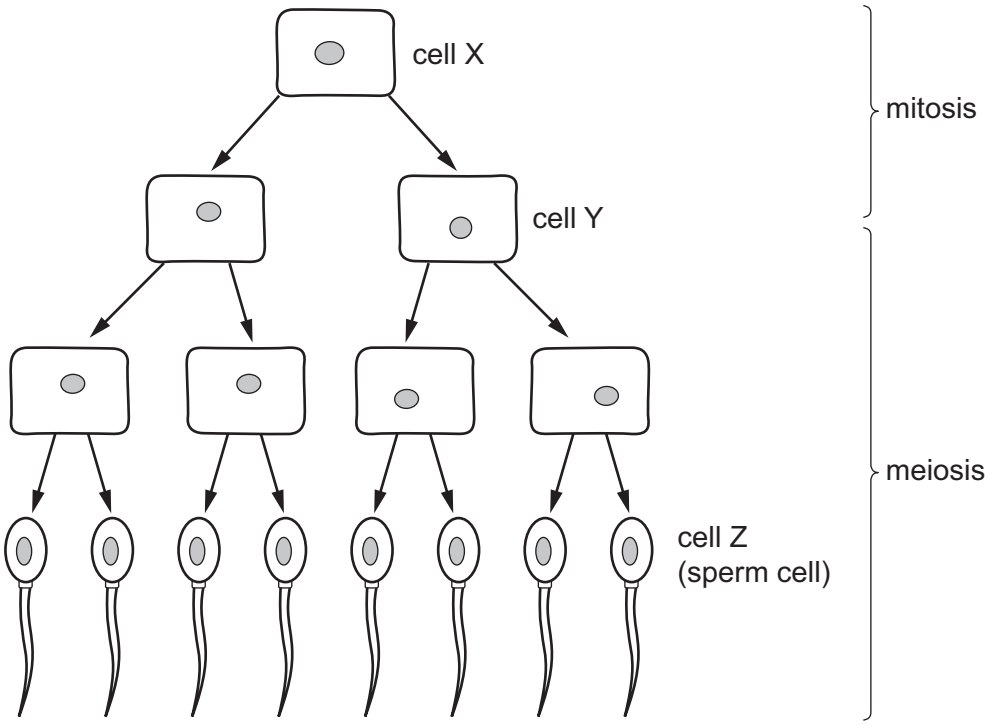
33 The diagram shows a flower cut in half.



Which **two** parts of the flower produce haploid gametes?

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

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

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

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36 Which row describes a sign, a symptom and a treatment for syphilis in males?

	sign	symptom	treatment
A	a pink rash on the body	development of painful joints	antibiotics
B	a sore on the penis	severe headaches	antibodies
C	profuse sweating	burning sensation during urination	antibiotics
D	yellow discharge from penis	infertility	antibodies

37 Which statements about genes and chromosomes are correct?

	A chromosome carries a molecule of DNA.	A gene is a section of DNA.
A	true	true
B	true	false
C	false	true
D	false	false

38 Which feature of bacteria shows discontinuous variation?

A the diameters of their cells

B the masses of their cytoplasm

C the numbers of their flagella

D the thicknesses of their cell walls

39 Over several hundred years, the milk production of a particular type of farm animal has steadily increased.

How has this been achieved?

A artificial selection

B continuous variation

C genetic engineering

D natural selection

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[Turn over

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

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