Cambridge O Level

Cambridge Assessment International Education
Cambridge Ordinary Level

BIOLOGY **5090/12**

Paper 1 Multiple Choice **May/June 2019**

1 hour

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

* 5 1 5 8 6 2 3 3 3 2 *

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 Which two structures are found in all plant epidermal cells?

A cell wall and chloroplasts

B cell wall and nucleus

C chloroplasts and starch grains

D nucleus and starch grains

2 Which process only occurs by diffusion?

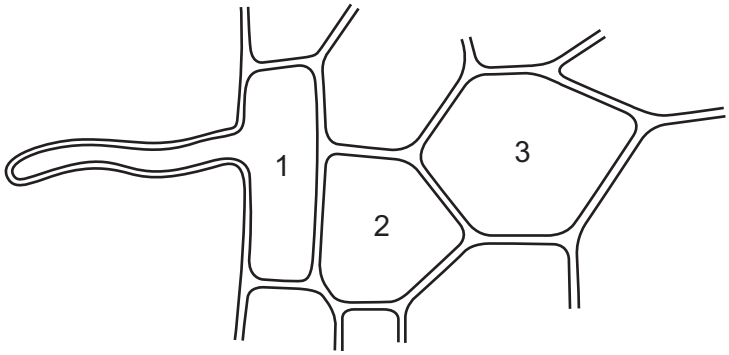
A movement of sugars in the phloem

B movement of water in the xylem

C uptake of carbon dioxide by the blood

D uptake of glucose by the intestinal villi

3 The diagram shows some cells in the root of a plant that is absorbing water from the soil.



How does the water potential of the cell marked 2 differ from the water potentials of the cells marked 1 and 3?

A higher than cell 1 and higher than cell 3

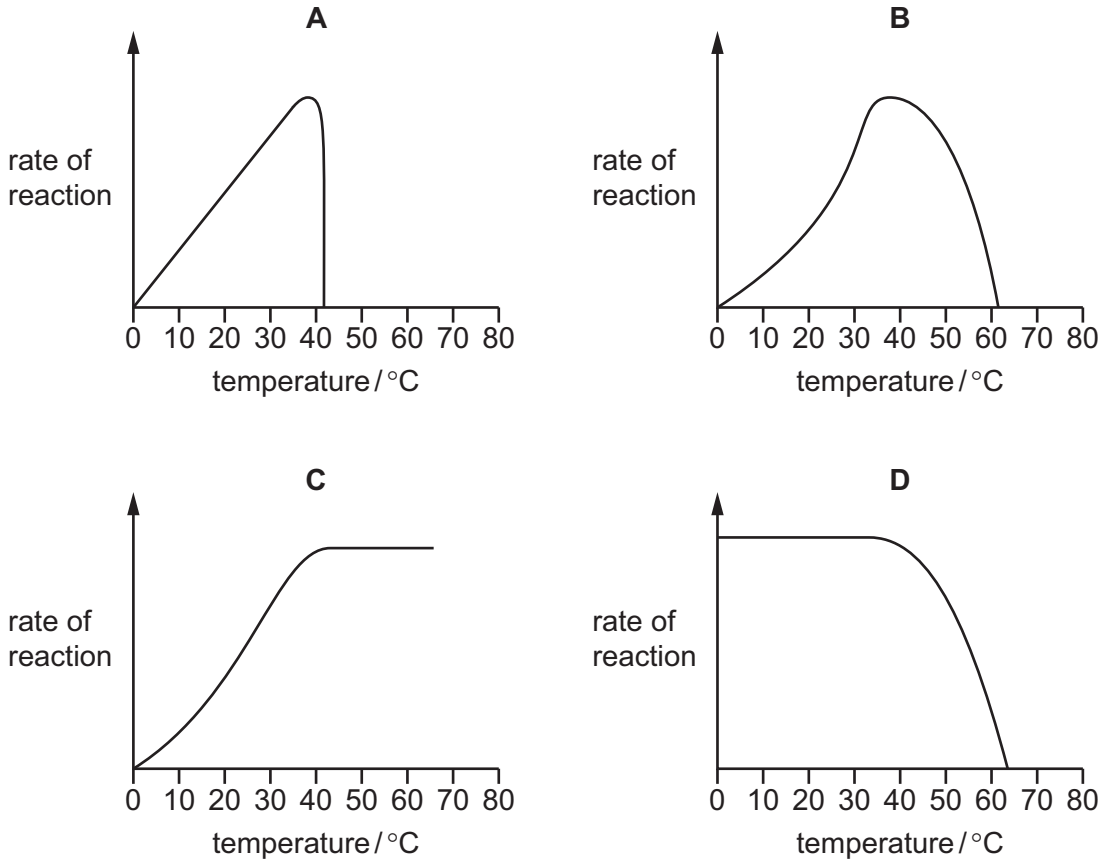
B higher than cell 1 and lower than cell 3

C lower than cell 1 and higher than cell 3

D lower than cell 1 and lower than cell 3

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4 Which graph shows the effect of temperature on the rate of a reaction catalysed by amylase?



5 What is the effect of a lack of nitrate ions on plant leaves?

A All leaves turn very dark green.

B Leaves lose their yellow colour.

C The leaves wilt.

D Young leaves grow very slowly.

6 Which word equation describes photosynthesis?

A carbohydrate + carbon dioxide → oxygen + water

B carbohydrate + oxygen → carbon dioxide + water

C carbon dioxide + water → carbohydrate + oxygen

D oxygen + water → carbohydrate + carbon dioxide

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[Turn over

7 A student performed an experiment to see whether chlorophyll is necessary for photosynthesis.

What is a suitable plant for this experiment?

A a plant in a closed jar with no access to carbon dioxide

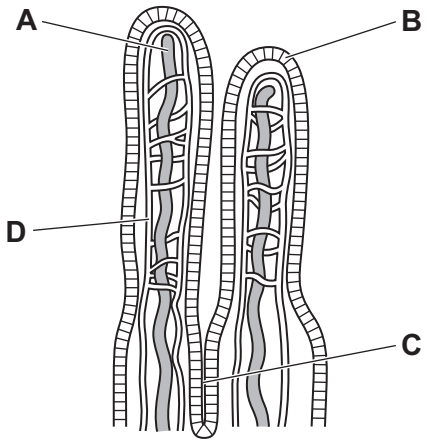
B a plant that has white patches on its leaves

C a plant with black paper pinned to both sides of one leaf

D a plant with wilted leaves

8 The diagram shows a section of the wall of the small intestine.

Into which structure are most of the lipid components of the diet absorbed for transport to the rest of the body?



9 A surgical procedure involves the removal of the gall bladder.

What are patients who have undergone this procedure **not** able to do?

A mix food with gastric juice

B produce bile

C store bile

D store urine

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10 The lengths of three parts of the human alimentary canal are shown.

part	length / cm
P	350
Q	150
R	26

Which row identifies these parts?

	P	Q	R
A	colon	duodenum	ileum
B	duodenum	ileum	colon
C	ileum	colon	duodenum
D	ileum	duodenum	colon

11 Which statement best describes the movement of water through the stem of a plant?

A Water moves up the stem as it evaporates from the leaves.

B Water moves up the stem as it is pushed by water entering the roots.

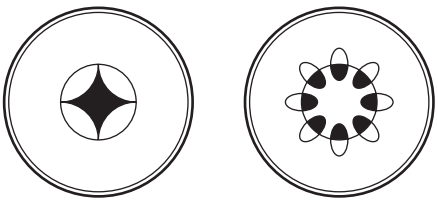
C Water moves up the stem because it is used in photosynthesis.

D Water moves up the stem by osmosis.

12 A plant was placed in water containing black dye. After 24 hours the plant was removed and sections were taken from the root and the stem.

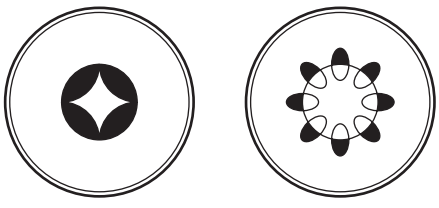
Which diagram shows the results?

A



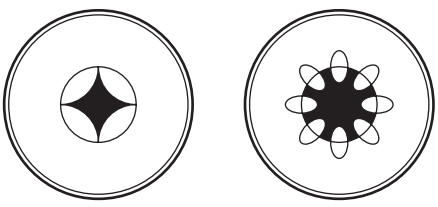
root stem

B



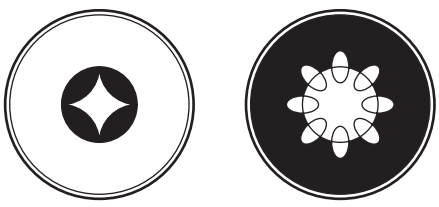
root stem

C



root stem

D



root stem

13 In a muscle, which two substances show net movement from the plasma **into** the tissue fluid?

A carbon dioxide and glucose

B carbon dioxide and lactic acid

C glucose and oxygen

D lactic acid and oxygen

14 Through which valve does the blood pass as it leaves the right ventricle and which structure does it next reach?

	valve	structure
A	atrioventricular (bicuspid)	left atrium
B	atrioventricular (tricuspid)	right atrium
C	semi-lunar	aorta
D	semi-lunar	pulmonary artery

15 Which statement about white blood cells is correct?

A They can ingest bacteria by a process called phagocytosis.

B They can produce antigens in response to foreign antibodies.

C They convert fibrinogen to fibrin when bleeding happens.

D They transport toxins from body tissues to the liver.

16 At night the temperature is 3 °C. A person goes outside for 30 minutes and their body temperature drops.

What is a reason for this temperature change?

A The person cannot get rid of carbon dioxide.

B The person has too much glucose for respiration.

C There is less oxygen in the cold air breathed in.

D The respiratory enzymes function more slowly.

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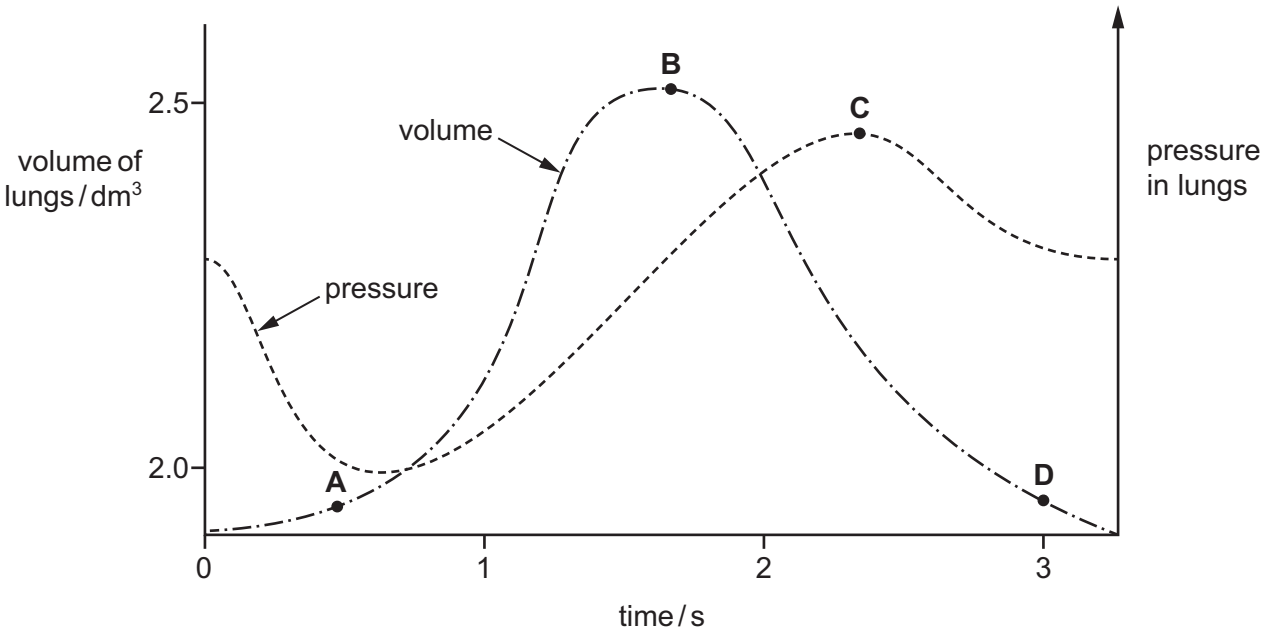
17 The table shows the percentages of four gases in inspired and expired air.

Which gas is carbon dioxide?

	inspired air	expired air
A	0.04	4.14
B	0.50	2.00
C	20.80	12.20
D	78.50	78.50

18 The graph shows how the pressure and volume inside the lungs change during one complete breath.

At which point are the muscles of the diaphragm starting to contract?



19 How does the composition of the blood in the renal vein differ from that in the renal artery?

	carbon dioxide concentration	urea concentration
A	higher	higher
B	higher	lower
C	lower	higher
D	lower	lower

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20 How will the skin of an athlete respond during a long run?

	width of blood vessels in skin surface	sweating
A	decreases	decreases
B	decreases	increases
C	increases	decreases
D	increases	increases

21 Which statement describes a simple reflex action involving an arm or leg?

A It does not involve the brain or spinal cord.

B It involves the spinal cord, and the brain is informed as to what has happened.

C It involves the spinal cord, without any information passing to the brain.

D The response is caused by nerve impulses from the brain.

22 What is correct for the formation of urea?

	formed from	formed in
A	amino acids	kidney
B	amino acids	liver
C	carbohydrate	kidney
D	carbohydrate	liver

23 What happens when a person focuses on a near object?

	ciliary muscles	lens	suspensory ligaments
A	contract	rounded	loose
B	contract	thin	taut
C	relax	rounded	loose
D	relax	thin	taut

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24 The diagram shows bones of the human forelimb.

Which bone is the radius?

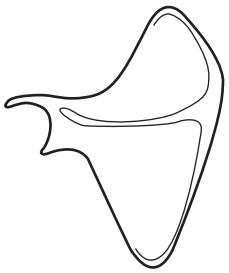
A



B



C



D



25 Which disease is strongly associated with cigarette smoking?

A anaemia

B bronchitis

C rickets

D scurvy

26 Which are the best conditions in a fermenter for the large-scale production of penicillin?

	aerobic conditions	anaerobic conditions	carbohydrates and amino acids	fats and proteins	*Penicillium*	yeast
A	✓	✗	✓	✗	✓	✗
B	✓	✗	✗	✓	✗	✓
C	✗	✓	✓	✗	✓	✗
D	✗	✓	✗	✓	✗	✓

27 Waste products from microorganisms are used in the production of bread and yoghurt.

Which waste products from microorganisms are used in these two processes?

	bread-making	yoghurt production
A	carbon dioxide	carbon dioxide
B	carbon dioxide	lactic acid
C	lactic acid	carbon dioxide
D	lactic acid	lactic acid

28 What eventually happens to all the energy in an ecosystem?

A It is lost from the system as heat.

B It is recycled by the decomposers.

C It is used by the producers.

D It is used by the top carnivore.

29 Which statement about the organisms at the beginning of food chains is correct?

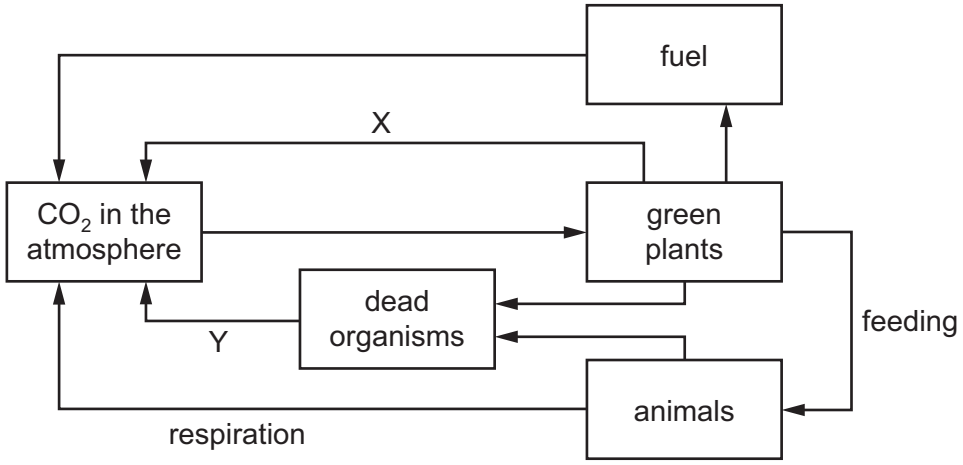
A They cause decay and provide minerals for the ecosystem.

B They feed on animals and recycle energy.

C They feed on plants and provide food for animals.

D They absorb nutrients and photosynthesise.

30 The diagram shows part of the carbon cycle.



What are the processes X and Y?

	X	Y
A	photosynthesis	decomposition
B	photosynthesis	excretion
C	respiration	photosynthesis
D	respiration	respiration

31 Which statements about mosquitoes are correct?

	where mosquitoes lay their eggs	sex of the adult mosquito that sucks blood
A	in decaying organic material	female
B	in decaying organic material	male
C	in stagnant water	female
D	in stagnant water	male

32 Some effects of deforestation are:

1 reduction of animal habitats

2 less absorption of carbon dioxide during photosynthesis

3 combustion releasing gases into the atmosphere

4 soil erosion and loss of minerals essential to plant growth

Which two effects are most likely to cause global warming?

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

33 A male gamete leaves the pollen tube immediately after the pollen tube has entered which structure?

A ovary

B ovule

C stigma

D style

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34 1000 seeds were placed in damp soil, in the dark, at 25 °C for 4 days. Each day equal numbers of germinating seeds were removed, dried, and their components separated and weighed.

The table shows the results.

	day				
	0	1	2	3	4
mean mass of whole seeds / mg	205	193	185	170	158
mean mass of seed cotyledons / mg	180	155	131	125	115
mean mass of radicle and plumule / mg	2	5	9	14	21

Which statements are supported by the data from this investigation?

1 Stored food in cotyledons provides materials for the growth of the radicle and plumule, during germination.

2 Whole seeds contain other structures beside the plumule, radicle and cotyledons.

3 Some stored food is respired to provide energy, and carbon dioxide is lost to the air.

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

35 Which sign of syphilis may appear many years after infection, if treatment is **not** given?

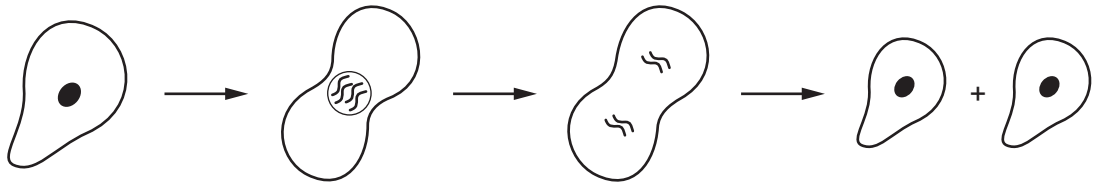
A a discharge from the penis or vagina

B a hard red ulcer appearing where infection happened

C damage to the central nervous system

D developing a red rash in many areas of the body

36 The diagram shows some stages during the asexual reproduction of a single-celled organism.



Which row correctly shows the relative amounts of DNA in each of the cells V, W, X, Y and Z?

	V	W	X	Y	Z
A	1	1	1	2	2
B	1	1	2	1	1
C	1	2	2	1	1
D	2	1	1	2	2

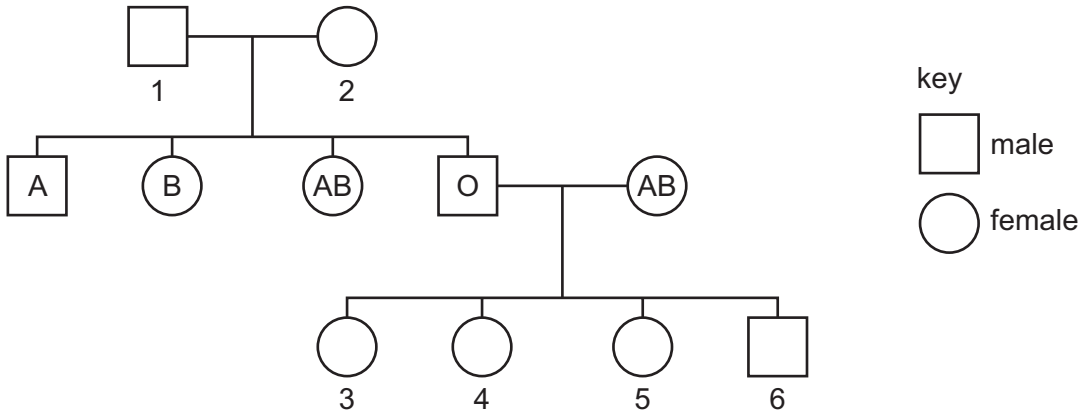
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37 Two heterozygous plants are crossed.

What is the likely ratio of homozygous genotypes to heterozygous genotypes in the offspring?

	homozygous genotypes	:	heterozygous genotypes
A	1	:	1
B	1	:	2
C	1	:	3
D	3	:	1

38 The diagram shows a family tree with the blood groups of some individuals labelled.



What are possible blood groups for the numbered individuals?

	1	2	3	4	5	6
A	A	B	A	A	B	B
B	A	B	A	B	AB	O
C	AB	O	A	A	B	B
D	AB	O	A	B	AB	O

39 Which product of genetic engineering of plants is linked to farming techniques that could reduce biodiversity?

A crops that produce medicines

B crops with higher yield

C drought-tolerant crops

D herbicide-resistant crops

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[Turn over

40 Which term describes reproduction between those members of a species that are best fitted to their environment?

A discontinuous variation

B gene mutation

C natural selection

D survival of the fittest

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