Cambridge Assessment International Education

Cambridge O Level

BIOLOGY **5090/11**

Paper 1 Multiple Choice **May/June 2023**

1 hour

You must answer on the multiple choice answer sheet.

You will need: Multiple choice answer sheet
Soft clean eraser
Soft pencil (type B or HB is recommended)

INSTRUCTIONS

- 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 multiple choice answer sheet.
- Follow the instructions on the multiple choice answer sheet.
- Write in soft pencil.
- Write your name, centre number and candidate number on the multiple choice answer sheet in the spaces provided unless this has been done for you.
- Do **not** use correction fluid.
- Do **not** write on any bar codes.
- You may use a calculator.

INFORMATION

- The total mark for this paper is 40.
- Each correct answer will score one mark.
- Any rough working should be done on this question paper.

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[Turn over

1 Which description applies to a red blood cell?

	cell wall	nucleus
A	absent	absent
B	absent	present
C	present	absent
D	present	present

2 A green-leafed plant produces spores.

To which group does the plant belong?

A dicotyledons

B fungi

C ferns

D monocotyledons

3 Which statement is always correct for both diffusion and osmosis?

A They depend on energy from cells.

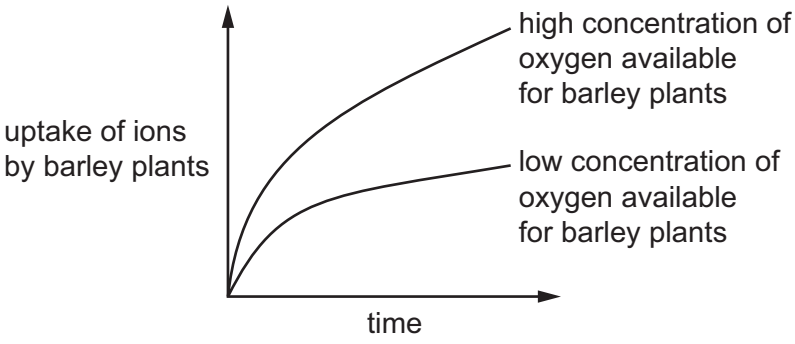
B They involve the movement of particles down a concentration gradient.

C They involve the movement of water molecules.

D They take place only in liquids.

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4 The graph shows the effect of oxygen on the uptake of ions by two sets of barley plants.



Except for oxygen availability, both sets of barley plants were grown in identical conditions.

Which process is taking place to explain the difference between the two curves?

A active transport

B diffusion

C osmosis

D photosynthesis

5 A student tested a sample of food.

The results are shown.

colour after adding Benedict's solution and heating	colour after adding biuret reagent	colour after adding iodine solution
red	purple	yellow / brown

Which nutrients were in the food?

A protein, starch and reducing sugar

B protein and starch only

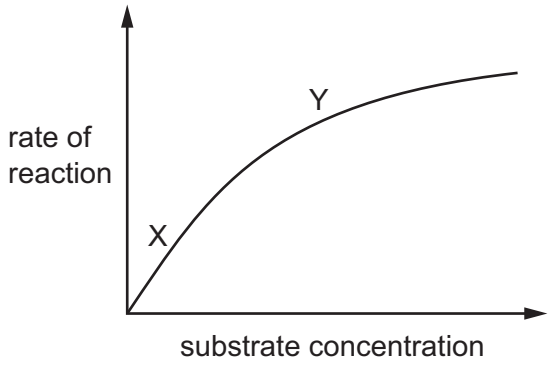
C protein and reducing sugar only

D starch and reducing sugar only

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6 The graph shows the effect of substrate concentration on the rate of an enzyme-controlled reaction.

The results have been obtained using a fixed concentration of enzyme at a temperature of 30 °C.



Which statement explains the shape of the graph from X to Y?

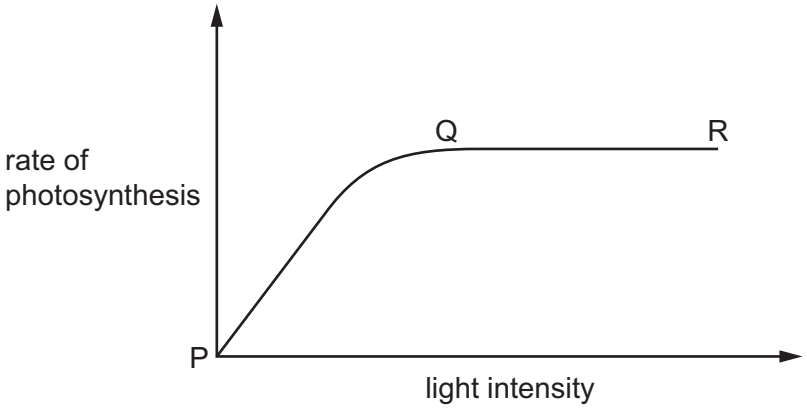
A Denaturation of the enzyme molecules is increasing.

B The enzyme active sites are not all occupied.

C The concentration of substrate molecules is decreasing.

D The frequency of effective collisions between enzyme active sites and substrate molecules is decreasing.

7 The graph shows how the rate of photosynthesis in a plant varies with light intensity.



Which statements are correct?

1 Light intensity is the only limiting factor in photosynthesis.

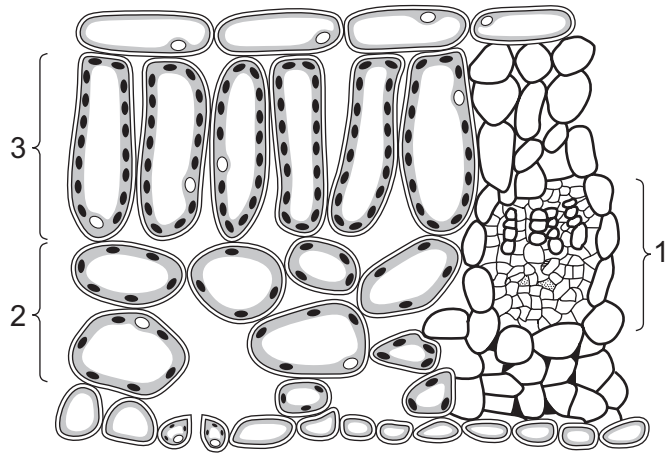
2 Between points P and Q on the graph, light intensity is the factor that is limiting the rate of photosynthesis.

3 Between Q and R, another factor is limiting the rate of photosynthesis.

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

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8 The diagram shows part of a transverse section through a leaf.



What are the main functions of the three labelled regions?

	region 1	region 2	region 3
A	photosynthesis	gas exchange	transport
B	transport	photosynthesis	gas exchange
C	transport	gas exchange	photosynthesis
D	gas exchange	transport	photosynthesis

9 Which description of the function of root hairs is correct?

A Root hairs absorb ions by active transport and osmosis.

B Root hairs absorb ions by osmosis only.

C Root hairs absorb water by active transport.

D Root hairs absorb water by osmosis.

10 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

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[Turn over

11 Which disease can be the result of a dietary deficiency of both a mineral ion and a vitamin?

A anaemia

B diabetes

C rickets

D scurvy

12 A student states: 'The contraction of circular muscles pushes the contents forward.'

Which process is being described?

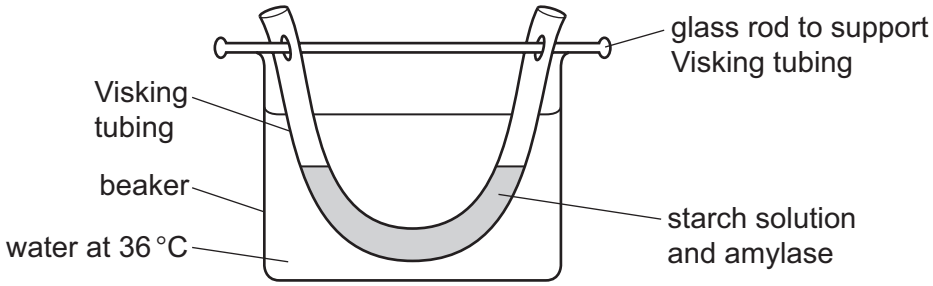
A peristalsis

B deamination

C translocation

D transpiration

13 An investigation is carried out on digestion and absorption in the alimentary canal. The diagram shows the apparatus used. The Visking tubing is permeable to small molecules such as glucose but not to large molecules such as starch.

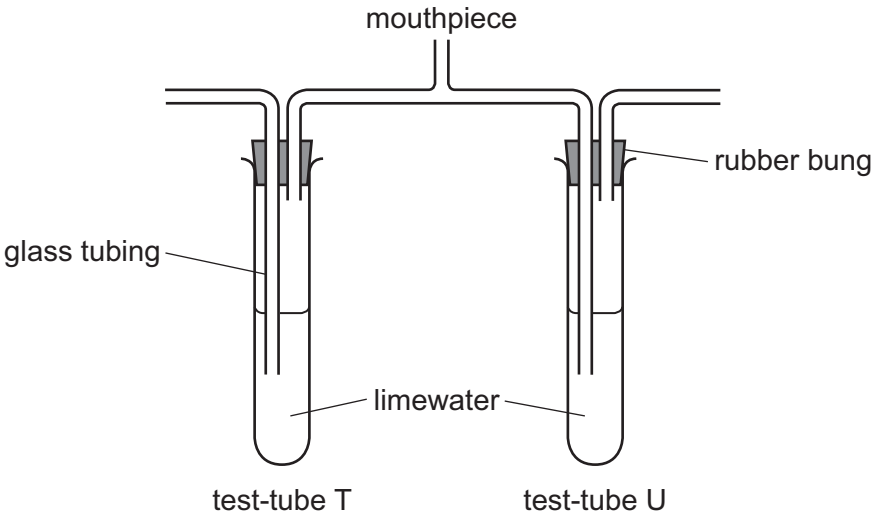


After one hour, samples of **water in the beaker** are tested with Benedict's solution and with iodine solution.

Which colours are obtained?

	colour obtained after heating with Benedict's solution	colour obtained after adding iodine solution
A	blue	blue-black
B	blue	yellow-brown
C	red	blue-black
D	red	yellow-brown

14 Some students were each given the apparatus shown.



They placed the mouthpieces in their mouths and then gently breathed in and out through the apparatus ten times.

Which statement describes what happened when they breathed in and out?

A When they breathed in, air from the room bubbled through test-tube U and the limewater became cloudy in test-tube U.

B When they breathed out, air from their lungs bubbled through test-tube T and the limewater became cloudy in test-tube T.

C When they breathed in, air from the room bubbled through test-tube T and the limewater remained clear in test-tube T.

D When they breathed out, air from their lungs bubbled through test-tube U and the limewater remained clear in test-tube U.

15 How many molecules of carbon dioxide will be produced from the breakdown of two molecules of glucose in aerobic respiration?

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

16 Which equation shows the type of respiration that can cause an 'oxygen debt' in muscles during vigorous exercise?

A glucose + oxygen $\rightarrow$ carbon dioxide + water

B glucose $\rightarrow$ lactic acid

C glucose $\rightarrow$ ethanol + carbon dioxide

D glucose $\rightarrow$ lactic acid + carbon dioxide + water

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17 Blood pressure was measured in the pulmonary artery, pulmonary capillaries and pulmonary vein.

Which blood pressure results could be correct?

	blood pressure in pulmonary artery / kPa	blood pressure in pulmonary capillaries / kPa	blood pressure in pulmonary vein / kPa
A	14	8	5
B	14	5	8
C	5	8	14
D	5	14	8

18 Which component of blood engulfs pathogens?

A lymphocytes

B phagocytes

C platelets

D red blood cells

19 What would help reduce transmission of malaria?

A use of a condom

B use of antibiotics

C use of mosquito nets

D washing hands

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20 The table shows the death rates from lung cancer in a country amongst smokers and non-smokers.

average number of cigarettes smoked per day	deaths from lung cancer per year per 100 000 people
0	10
1–14	78
15–25	127
26 or more	251

What can be concluded from the data?

A People who get lung cancer are likely to be smokers of 26 or more cigarettes per day.

B People who do not smoke will not get lung cancer.

C People who smoke have a higher chance of getting lung cancer.

D Smoking is the only cause of lung cancer.

21 What is one way that development of antibiotic-resistant bacteria can be minimised?

A sharing antibiotics with family members

B use of antibiotics only when essential

C use of antibiotics to prevent infection

D use of antibiotics to treat all infections

22 What are the effects of the human immunodeficiency virus (HIV) on the immune system?

	immune system	antibody production	number of lymphocytes
A	becomes weaker	decreases	decreases
B	becomes weaker	increases	increases
C	becomes stronger	decreases	decreases
D	becomes stronger	increases	increases

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23 The blood in the renal vein has a different composition to the blood in the renal artery.

How is the blood in the renal vein different?

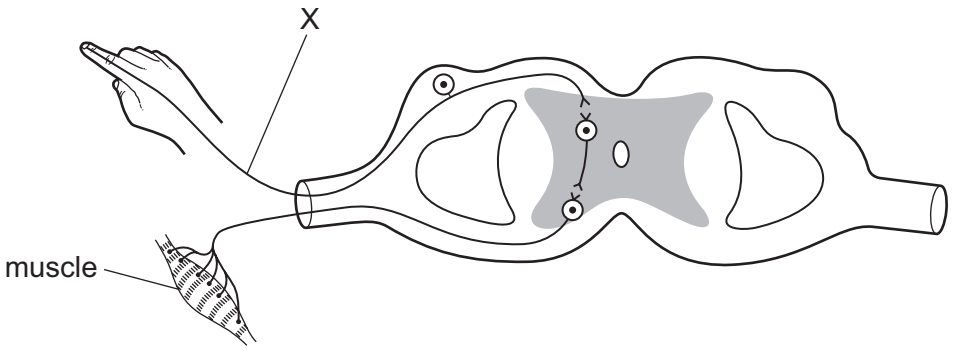
A less carbon dioxide, less urea, less water

B less oxygen, more urea, less water

C more carbon dioxide, less urea, less water

D more oxygen, less urea, less water

24 The diagram shows a reflex arc.



A person was involved in an accident and their arm was injured. The sensory neurones at X were cut.

Which statement describes what happens if this person touches a hot object with their finger?

A The person is not able to feel their finger touching the hot object but is able to move their finger away from the heat stimulus.

B The person is not able to feel their finger touching the hot object or move their finger away from the heat stimulus.

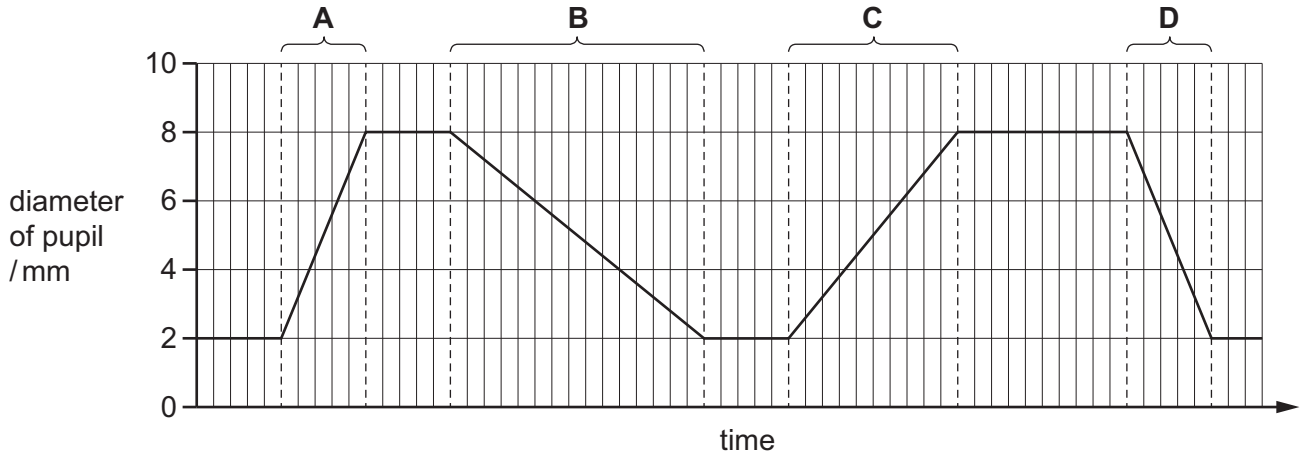
C The person can feel the heat stimulus but is not able to move their finger away from the heat stimulus.

D The receptor cells in the person's finger are not stimulated by the heat.

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25 The diameter of a person's pupil is measured as the light intensity is varied.

During which time period does the light intensity increase fastest?



26 On a warm sunny day, a swimmer climbs out of a pool and sits on the edge to dry.

After a few minutes, the swimmer's skin begins to feel cold.

What has caused this to happen?

A Body temperature drops until it reaches air temperature.

B Muscles and other organs stop producing heat from respiration.

C Sunlight causes the hypothalamus to begin processes that increase heat loss.

D Water on the skin absorbs heat from the body and evaporates.

27 A genetic disorder causes too much insulin to be secreted.

What is the effect of the secretion of too much insulin?

A Blood glucose concentration is low.

B Glucose can be detected in the urine.

C Glycogen level in the liver is low.

D Less glucose is converted to glycogen.

28 Auxin is a chemical produced by plants.

What is the role of auxin?

A It stimulates cells in the plant shoot to elongate.

B It stimulates meiotic cell division.

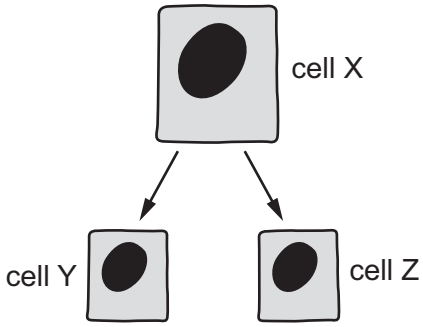
C It stimulates the development of a branching root system.

D It stimulates the process of seed germination.

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[Turn over

29 The diagram shows cell X which contains 24 chromosomes. It divides by mitosis to produce cells Y and Z.



How many chromosomes does cell Z contain?

A 12 **B** 24 **C** 46 **D** 48

30 What is a feature of asexual reproduction in a plant?

A All the offspring will grow to an identical height.

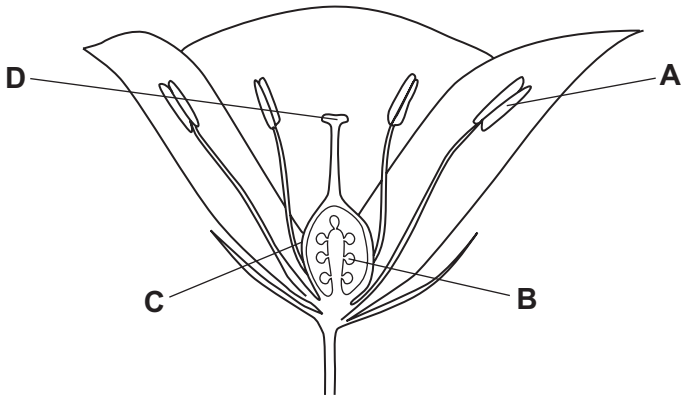
B Any seeds produced will be identical.

C The plant needs to carry out the process of meiosis.

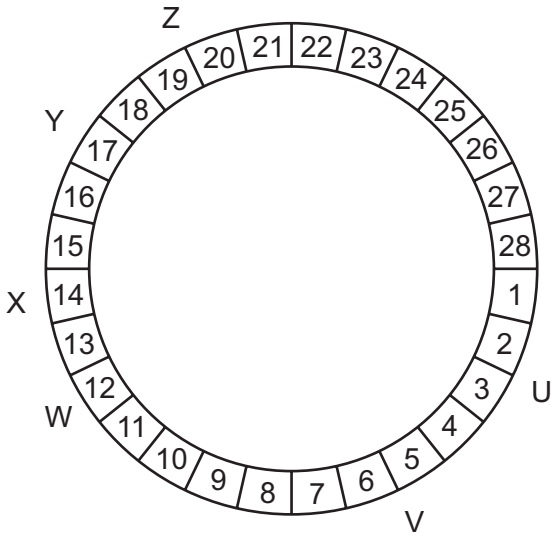
D The offspring will all have identical genotypes.

31 The diagram shows the parts of a flower.

Which labelled part will develop into a seed following fertilisation?



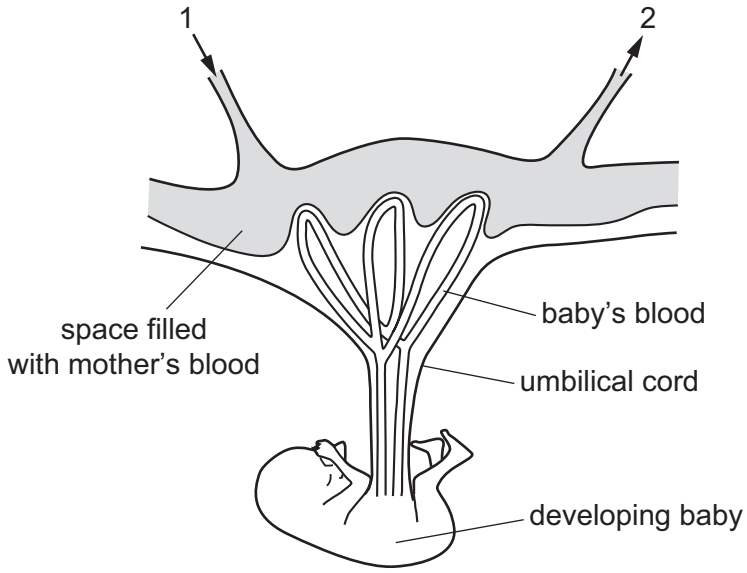
32 The diagram shows the 28 days of a typical menstrual cycle. The letters around the outside indicate different points in the cycle.



Which row shows the points in the cycle?

	stage of cycle		
	maximum thickness of uterus lining	menstruation	ovulation
A	Z	W	X
B	X	U	Y
C	Z	U	X
D	V	X	Z

33 The diagram shows the arrangement of blood vessels in the uterus wall and placenta of a pregnant woman.



What will increase in concentration in the blood as it flows from 1 to 2?

A amino acids

B carbon dioxide

C glucose

D oxygen

34 Some lizards in a population had longer leg bones than others. They were able to climb better than the lizards with shorter legs, so they were able to escape from their predators on the ground. Over time, lizards with shorter legs died out so that all the lizards in the population now have longer legs.

Which process has caused this change within the lizard population?

A extinction

B natural selection

C conservation

D artificial selection

35 The genotype for the height of an organism is written as Tt.

Which conclusion may be drawn?

A The allele for height has at least two different genes.

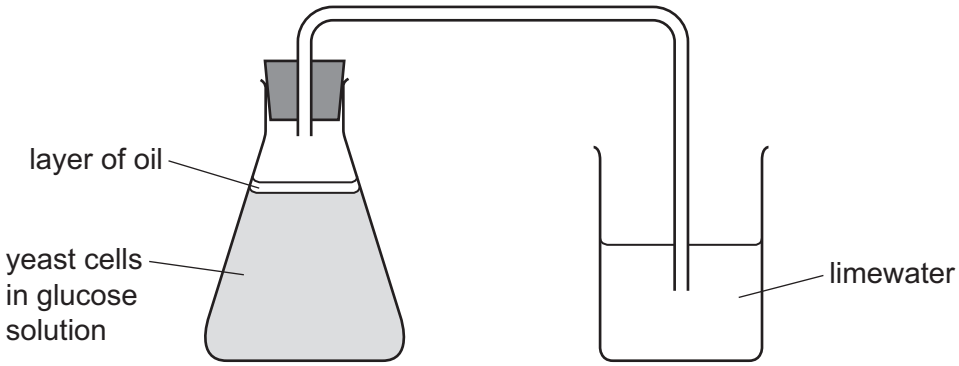
B There are at least two different alleles of the gene for height.

C There are two different genes for height, each having a single allele.

D There is one allele for height with two different forms.

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36 The diagram shows some apparatus set up to produce alcohol by fermentation.



What is the purpose of the layer of oil?

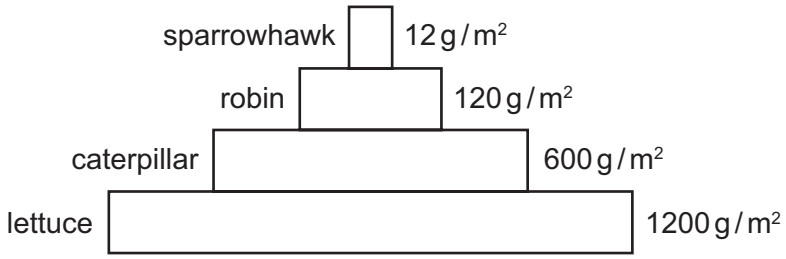
A to keep the alcohol in the solution

B to prevent aerobic respiration

C to produce carbon dioxide

D to provide nutrients for the yeast

37 The diagram shows a pyramid of biomass.



Which percentage of biomass is passed from the primary consumer to the secondary consumer?

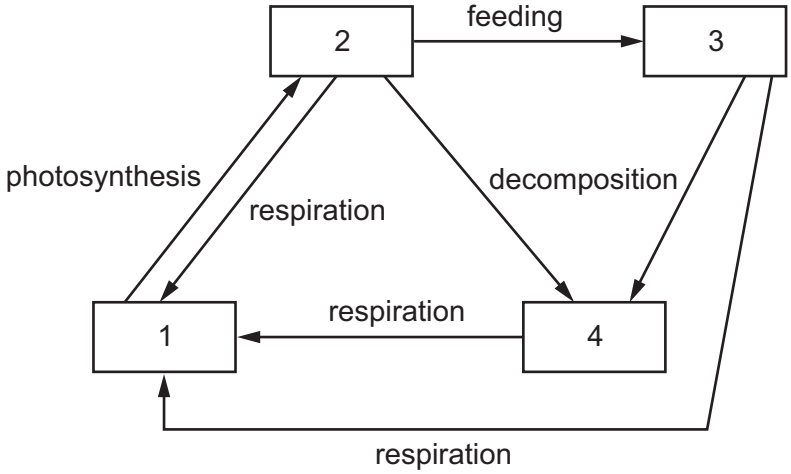
A 1% **B** 10% **C** 20% **D** 50%

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38 The diagram shows part of the carbon cycle.



Which row shows the correct labels for the numbered boxes?

	1	2	3	4
A	plants	the air	decomposers	animals
B	the air	plants	decomposers	animals
C	plants	the air	animals	decomposers
D	the air	plants	animals	decomposers

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

A non-biodegradable plastics in the ocean

B pollution due to insecticides

C emissions from burning fossil fuels

D water pollution by sewage

40 Drainage from fields where nitrogen-containing fertilisers have been spread can result in fish dying in rivers.

Which sequence of events describes what happens when fish die as a result of water pollution by nitrogen-containing fertilisers?

A less oxygen dissolved in the water → more growth of water plants → more plant decomposition by bacteria

B less oxygen dissolved in the water → more plant decomposition by bacteria → less plant growth

C more growth of water plants → less plant decomposition by bacteria → more oxygen dissolved in the water

D more growth of water plants → more plant decomposition by bacteria → less oxygen dissolved in the water

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