Cambridge Assessment International Education

Cambridge IGCSE™

BIOLOGY **0610/21**

Paper 2 Multiple Choice (Extended) **October/November 2025**

45 minutes

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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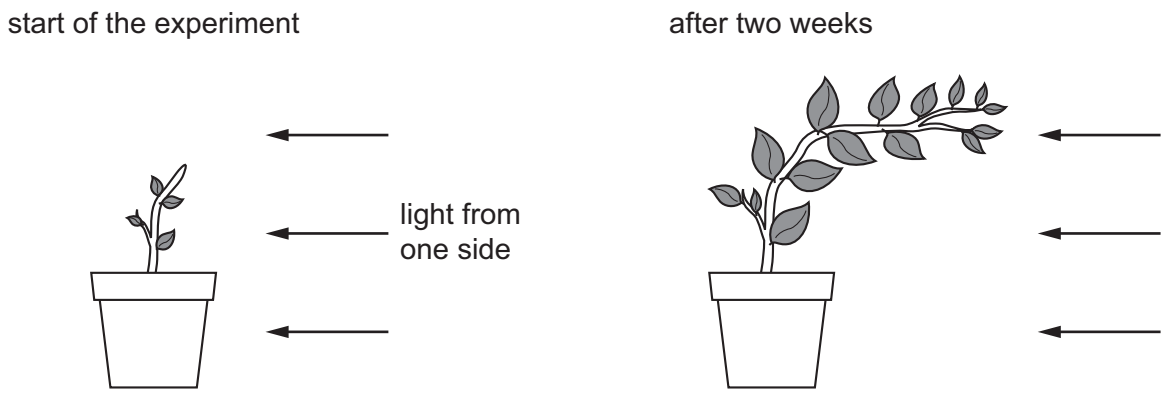
1 The diagrams show a plant at the start of an experiment, and the same plant two weeks later.



Which characteristics of living organisms are demonstrated by this experiment?

A excretion and growth

B excretion and reproduction

C growth and sensitivity

D sensitivity and reproduction

2 What can be used to classify organisms?

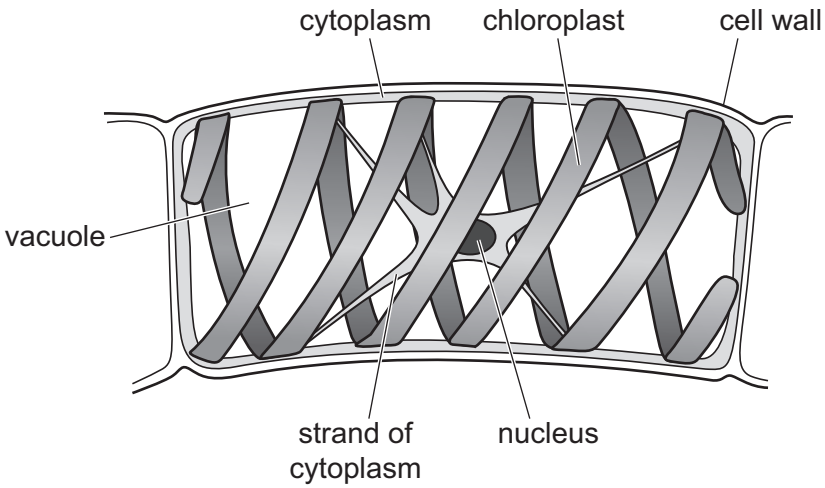
A the number of bases in DNA

B the number of different types of bases in DNA

C the sequence of bases in DNA

D the sequence of bases in one protein

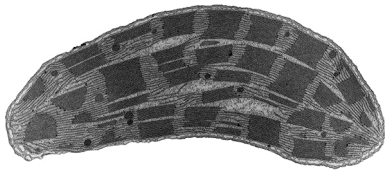
3 The diagram shows a single cell from an organism called *Spirogyra*.



Which features does *Spirogyra* share with plant cells?

	cell wall	chloroplast	cytoplasm	nucleus	vacuole
A	yes	yes	yes	yes	yes
B	yes	yes	no	no	yes
C	yes	no	yes	yes	no
D	no	yes	yes	no	yes

4 The diagram shows an image of a chloroplast. The image is 5 cm long.



The actual length of the chloroplast is 5 μm.

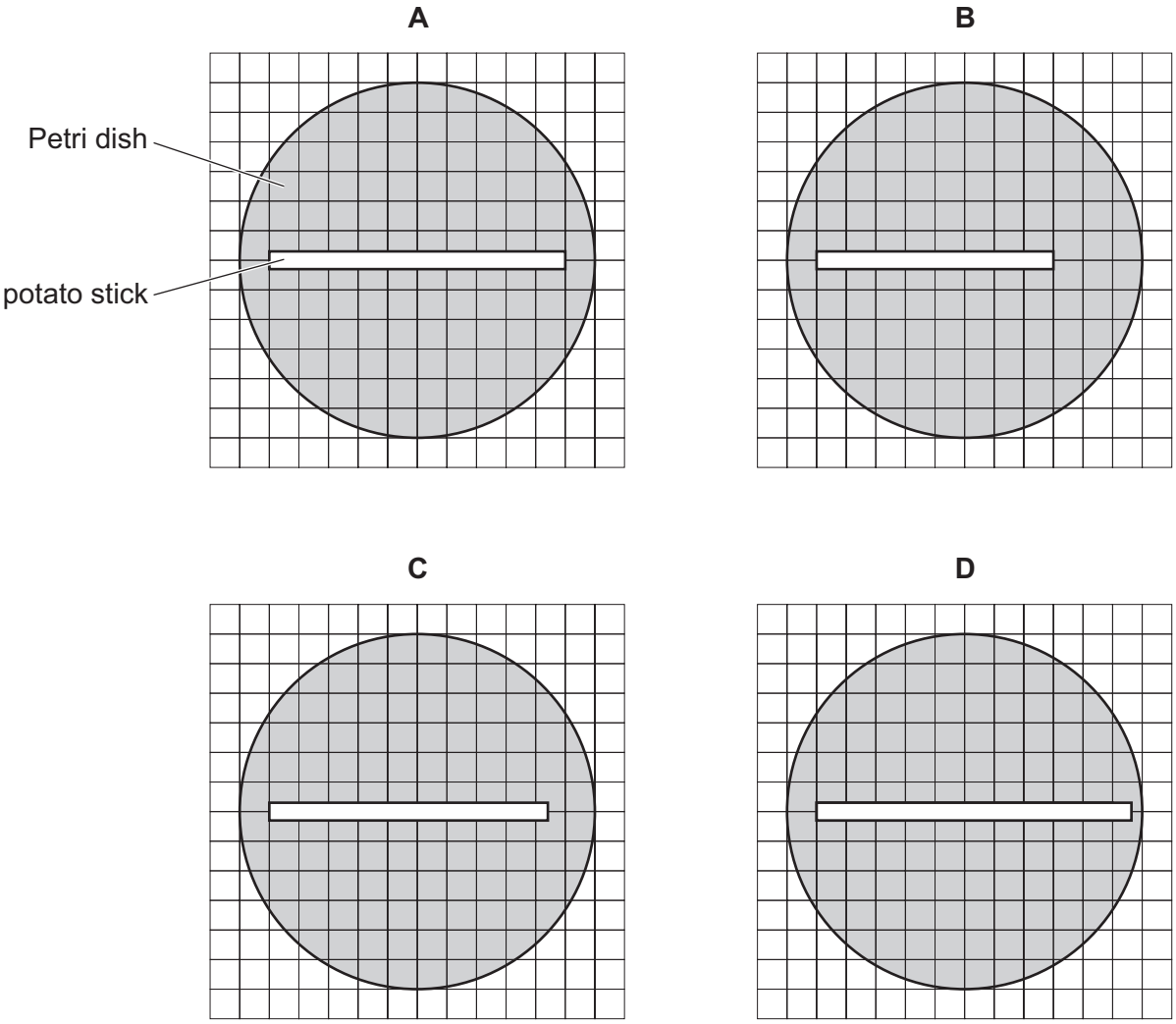
What is the magnification of the image?

A ×10 **B** ×1000 **C** ×10 000 **D** ×100 000

5 A potato was used as a source of plant tissue. Four potato sticks of identical size were cut from the same potato. At the start of the investigation, each potato stick was 10 squares long. The potato sticks were put into four separate Petri dishes. Each Petri dish contained a different concentration of sugar solution.

The diagram shows the four Petri dishes after 24 hours.

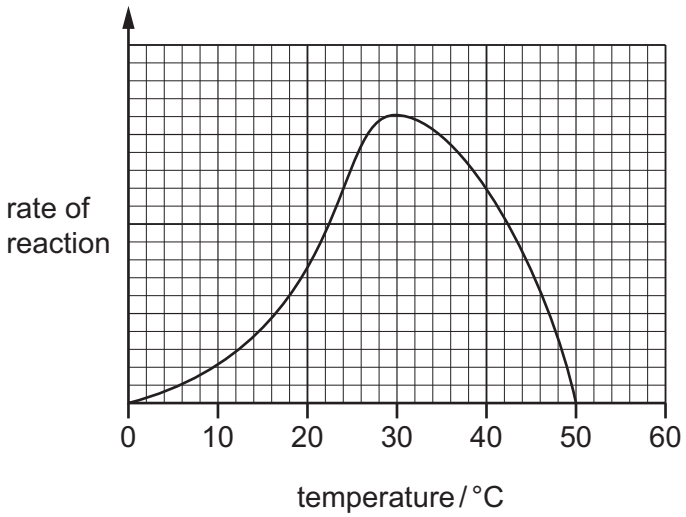
Which dish contains a sugar solution that has a higher water potential than the potato tissue?



6 Which row shows correct statements about active transport?

	direction of movement	requires a partially permeable membrane
A	down a concentration gradient	no
B	down a concentration gradient	yes
C	against a concentration gradient	no
D	against a concentration gradient	yes

7 The graph shows the effect of temperature on an enzyme-controlled reaction.



Which statement describes the effect of temperature on this reaction?

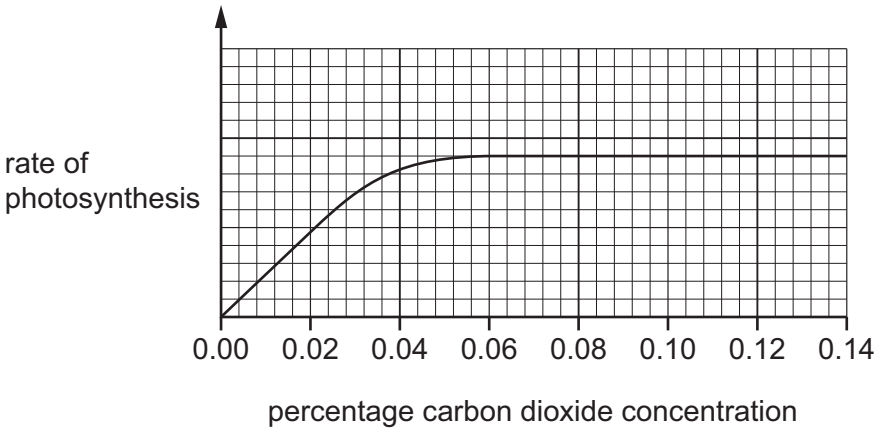
A As the temperature increases to 25 °C, the reaction speeds up.

B Between 10 °C and 20 °C, the enzyme denatures.

C Between 35 °C and 45 °C, frequency of effective collisions increases.

D The optimum temperature for this reaction is 40 °C.

8 The graph shows the rate of photosynthesis of a plant in full sunlight in different concentrations of carbon dioxide. All other factors were kept constant.



What limits the rate of photosynthesis at 0.02% carbon dioxide concentration?

A carbon dioxide concentration

B humidity

C light intensity

D temperature

[Turn over

9 A student wrote some statements about the palisade mesophyll and spongy mesophyll tissues.

1 The spongy mesophyll tissue is near the stomata for gas exchange.

2 Only palisade mesophyll cells have chloroplasts for photosynthesis.

3 Palisade cells are closely packed but there are air spaces in the spongy mesophyll tissue.

Which statements are correct descriptions of the two tissues?

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

10 What is a role of bile?

A It contains enzymes that digest starch.

B It emulsifies fats, increasing their surface area.

C It kills bacteria in food.

D It provides the optimum pH for pepsin activity.

11 Where in the alimentary canal is the enzyme trypsin found and what are the products of the reaction trypsin catalyses?

	where trypsin is found	products
A	duodenum	amino acids
B	duodenum	fatty acids
C	ileum	proteins
D	stomach	amino acids

12 What is a structural feature of xylem vessels?

A contain many mitochondria

B made up of cells joined end to end

C presence of cross walls

D thin walls

13 During the growing season, tomato plants produce flowers and fruits.

Which parts of a growing tomato plant are sources, and which parts are sinks?

	flowers	fruits	leaves
A	sink	sink	source
B	sink	source	sink
C	source	sink	source
D	source	source	sink

14 Which statements are correct descriptions of methods of preventing pathogens from entering the body?

1 Fibrin is converted to fibrinogen to form a mesh.

2 Phagocytes produce antibodies.

3 Platelets clot blood.

4 Lymphocytes engulf pathogens.

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

15 Which statement describes a double circulatory system?

A Blood goes through the lungs twice every time it goes round the body.

B Blood goes through the kidneys twice every time it goes round the body.

C Blood goes through the heart twice every time it goes round the body.

D Blood goes through the brain twice every time it goes round the body.

16 Three statements about immunity are listed.

1 Specific antibodies are produced in response to specific antigens.

2 Pathogens have specific antigens.

3 A vaccination stimulates an immune response.

Which statements are correct?

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

17 Which muscles in the breathing system contract during inspiration?

A external intercostal and diaphragm only

B external intercostal and internal intercostal only

C external intercostal, internal intercostal and diaphragm

D internal intercostal and diaphragm only

18 Which process requires energy from respiration?

A diffusion

B osmosis

C protein synthesis

D transpiration

19 What is produced by anaerobic respiration in human muscles?

	carbon dioxide	lactic acid	water
A	✓	✓	✗
B	✓	✗	✓
C	✗	✓	✗
D	✗	✗	✓

key

✓ = substance is produced

✗ = substance is **not** produced

20 Which statements are correct for a healthy person?

1 Blood leaving a glomerulus has the same concentration of glucose as blood entering a glomerulus.

2 There is no glucose in the fluid leaving a nephron.

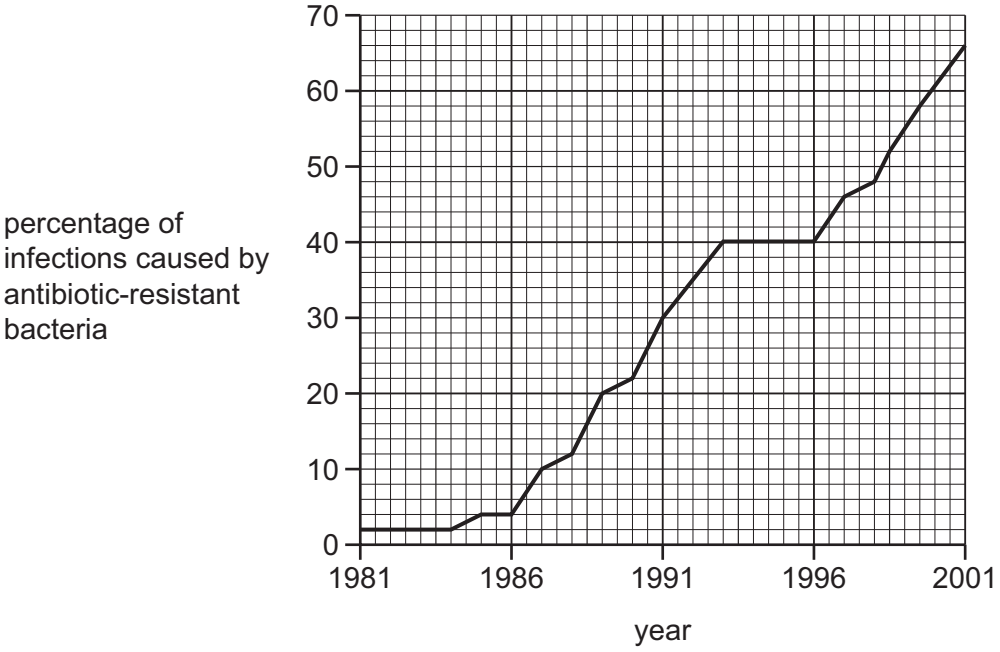
3 A nephron reabsorbs all of the water and some of the ions filtered out of the blood by a glomerulus.

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

21 When moving from an area with low light intensity to an area with high light intensity, how do the circular and radial muscles of the iris react?

	circular muscles	radial muscles
A	contract	no change
B	contract	relax
C	relax	contract
D	relax	no change

22 The graph shows the change in the percentage of infections caused by antibiotic-resistant bacteria in one country.



Which statements could explain the change in the percentage of infections caused by antibiotic-resistant bacteria?

1 The use of antibiotics has resulted in natural selection for resistant bacteria.

2 The use of antibiotics has caused a decrease in viral diseases.

3 The use of antibiotics when **not** essential increased the percentage of antibiotic-resistant infections.

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

23 A gardener has a strawberry plant that produces large, sweet fruits.

How does the gardener grow more strawberry plants that **all** produce large, sweet fruits?

A Use asexual reproduction to produce offspring with no genetic variation.

B Use asexual reproduction to produce seeds that will grow into new plants.

C Use sexual reproduction and self-pollination as they only have one plant.

D Use sexual reproduction to reduce variation in the offspring.

24 Where does fertilisation occur in a plant?

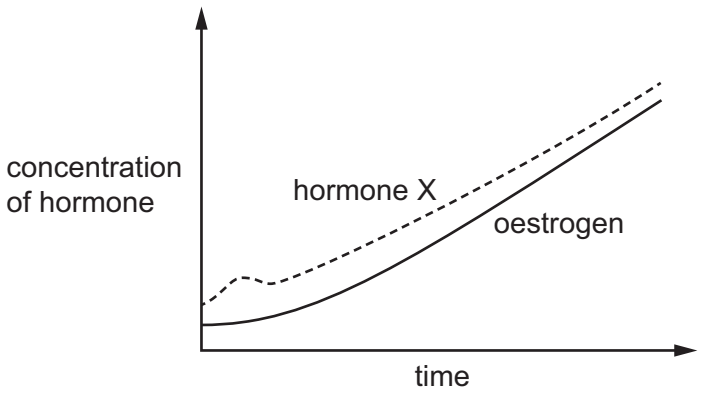
A ovule

B pollen grain

C pollen tube

D stigma

25 The graph shows the concentrations of two hormones during pregnancy.



Which organ secretes the most hormone X in the late stages of pregnancy?

A ovary

B placenta

C uterus

D vagina

26 A person has a 28-day menstrual cycle.

On which day is the lining of the uterus thickest?

A 2 **B** 4 **C** 9 **D** 21

27 Which statements describe the sex chromosomes in human gametes?

1 Egg cells contain either an X or a Y chromosome.

2 Egg cells contain only X chromosomes.

3 Sperm cells contain either an X or a Y chromosome.

4 Sperm cells contain only Y chromosomes.

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

28 Which statement describes the effect of meiosis on chromosome number?

A A diploid parent cell produces diploid daughter cells.

B A diploid parent cell produces haploid daughter cells.

C A haploid parent cell produces diploid daughter cells.

D A haploid parent cell produces haploid daughter cells.

29 A female with red-green colour blindness has a child with a male who does **not** have red-green colour blindness. The child is male.

What is the chance of this child having red-green colour blindness?

A 0% **B** 25% **C** 50% **D** 100%

30 What is a source of genetic variation that alters the base sequence of DNA?

A gene mutation

B mitosis

C random fertilisation

D random mating

31 Which technique is **not** used to conserve endangered animal species?

A artificial insemination

B captive breeding programmes

C *in vitro* fertilisation

D seed banks

32 Which flowchart shows how energy is transferred from the Sun to an organism?

A chemical energy in carbohydrates → stored in plants → energy trapped by chlorophyll

B stored in plants → chemical energy in carbohydrates → energy trapped by chlorophyll

C stored in plants → energy trapped by chlorophyll → chemical energy in carbohydrates

D energy trapped by chlorophyll → chemical energy in carbohydrates → stored in plants

33 Which statements about a food chain are correct?

1 Between trophic level 1 and trophic level 2, energy is passed from a herbivore to a carnivore.

2 Between trophic level 2 and trophic level 3, energy is passed from a primary consumer to a secondary consumer.

3 Between trophic level 3 and trophic level 4, energy is passed from a secondary consumer to a tertiary consumer.

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

34 Which process in the nitrogen cycle is involved in the breakdown of amino acids in living organisms?

A deamination

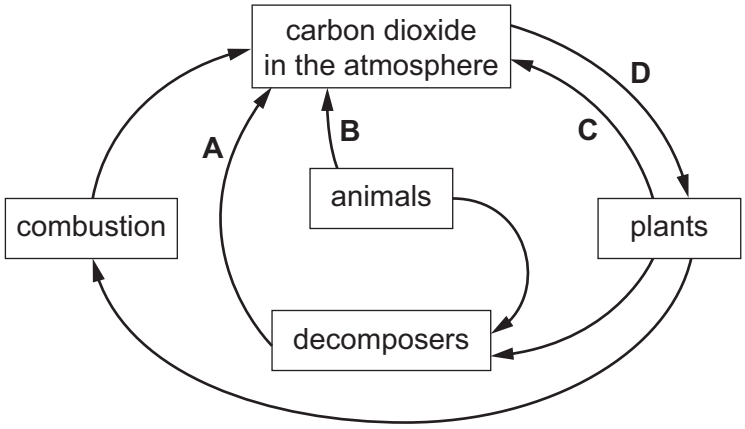
B decomposition

C denitrification

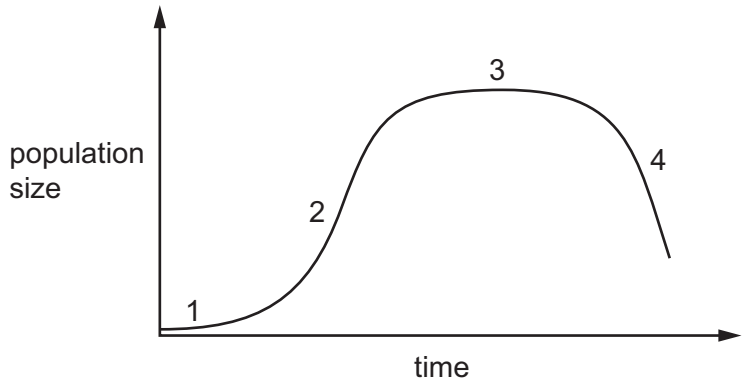
D digestion

35 The diagram shows part of the carbon cycle.

Which arrow represents photosynthesis?



36 The graph shows how the size of a population changes over time.



Which row identifies the phases of population growth?

	death phase	exponential phase	lag phase
A	3	1	4
B	3	2	1
C	4	1	3
D	4	2	1

37 Eutrophication results in a reduction in the dissolved oxygen in streams and lakes.

What causes the reduction in dissolved oxygen?

A decreased aerobic respiration by decomposers

B decreased aerobic respiration by fish

C increased aerobic respiration by decomposers

D increased aerobic respiration by fish

38 What are reasons for using chemical fertilisers in food production?

	to reduce the use of herbicides	to increase crop yields	to reduce competition between crops and weeds
A	yes	yes	yes
B	no	yes	no
C	yes	no	no
D	no	no	yes

[Turn over

39 Why is pectinase useful in fruit juice production?

A Cloudier juice is produced.

B More juice can be extracted from the fruits.

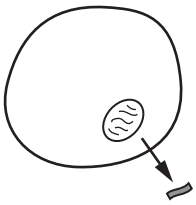
C Proteins in the fruit are digested.

D Starch is digested to produce more sugar.

40 The diagrams show the stages in the production of human insulin.

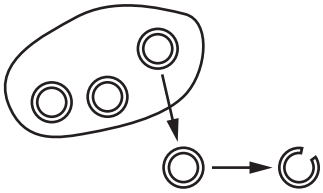
Which stage uses the enzyme DNA ligase?

A



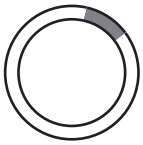
The gene for insulin is identified and removed from a human cell.

B



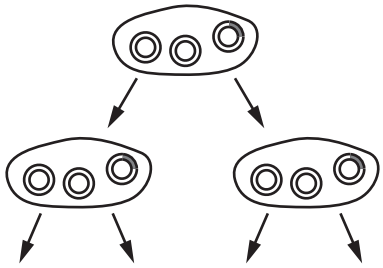
A plasmid is removed from a bacterium and cut open.

C



The gene for insulin is inserted into the plasmid.

D



The plasmid is inserted into a bacterium that reproduces, and insulin is produced.

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