Cambridge Assessment International Education

Cambridge IGCSE™

BIOLOGY **0610/21**

Paper 2 Multiple Choice (Extended) **October/November 2020**

45 minutes

You must answer on the multiple choice answer sheet.

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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. A mark will not be deducted for a wrong answer.
- Any rough working should be done on this question paper.

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[Turn over

1 Hedgehogs are mammals. Touching a hedgehog causes it to roll into a ball to protect itself.

Which characteristics is it displaying?

A excretion and movement

B growth and sensitivity

C movement and growth

D movement and sensitivity

2 What are features of the leaves of a plant that is a dicotyledon?

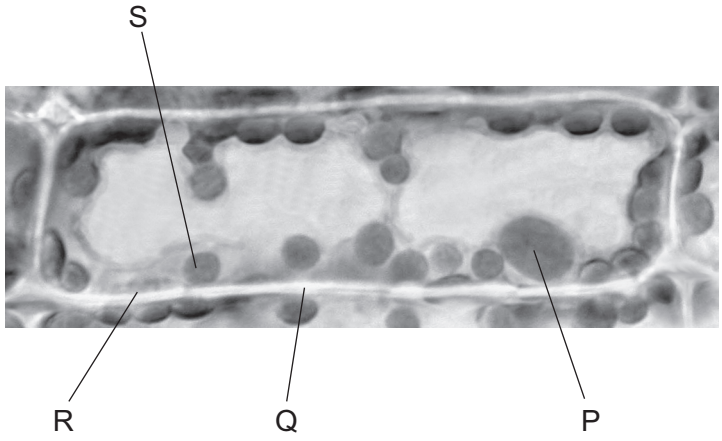
	broad leaves	parallel veins
A	✓	✓
B	✓	✗
C	✗	✓
D	✗	✗

key

✓ = yes

✗ = no

3 The photomicrograph shows a cell from a type of aquatic plant.

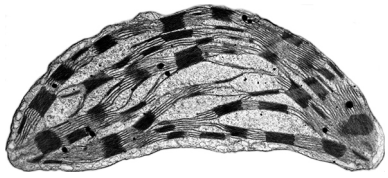


Which parts labelled on the photomicrograph indicate that this is a plant cell?

A P and R **B** P and S **C** Q and R **D** Q and S

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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?

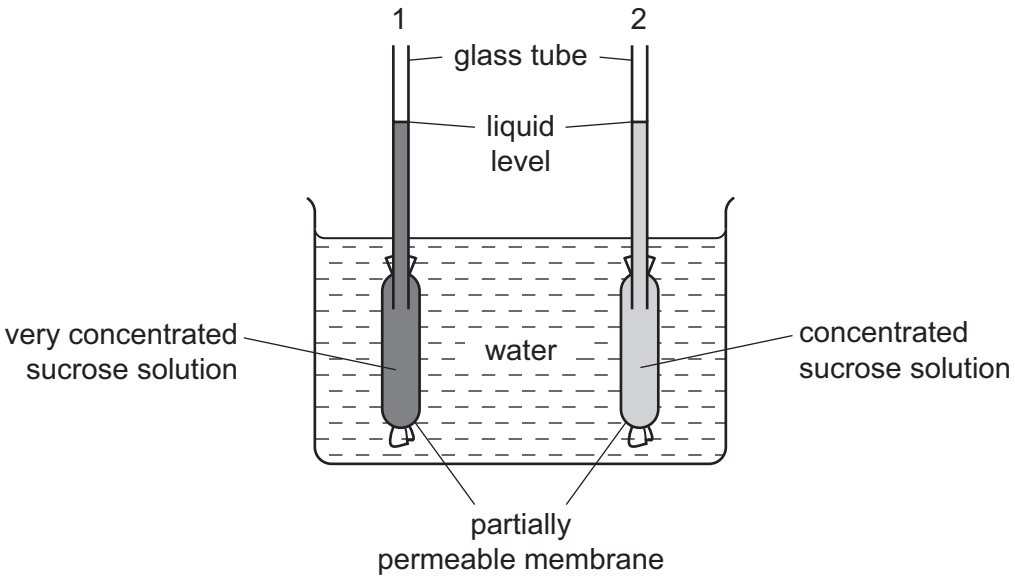
A ×10 **B** ×1000 **C** ×10 000 **D** ×100 000

5 What are features of osmosis?

	diffusion is involved	requires cell walls	requires a partially permeable membrane
A	✓	✗	✓
B	✓	✗	✗
C	✗	✓	✓
D	✗	✓	✗

key
✓ = yes
✗ = no

6 The diagram shows apparatus which can be used to demonstrate osmosis.



After one hour, what would happen to the liquid levels in the glass tubes?

	liquid level in tube 1	liquid level in tube 2
A	falls	falls
B	falls	rises
C	rises	falls
D	rises	rises

7 Which substances are made by linking together glucose molecules only?

A cellulose, glycogen and starch

B fats, cellulose and proteins

C proteins, oils and glycogen

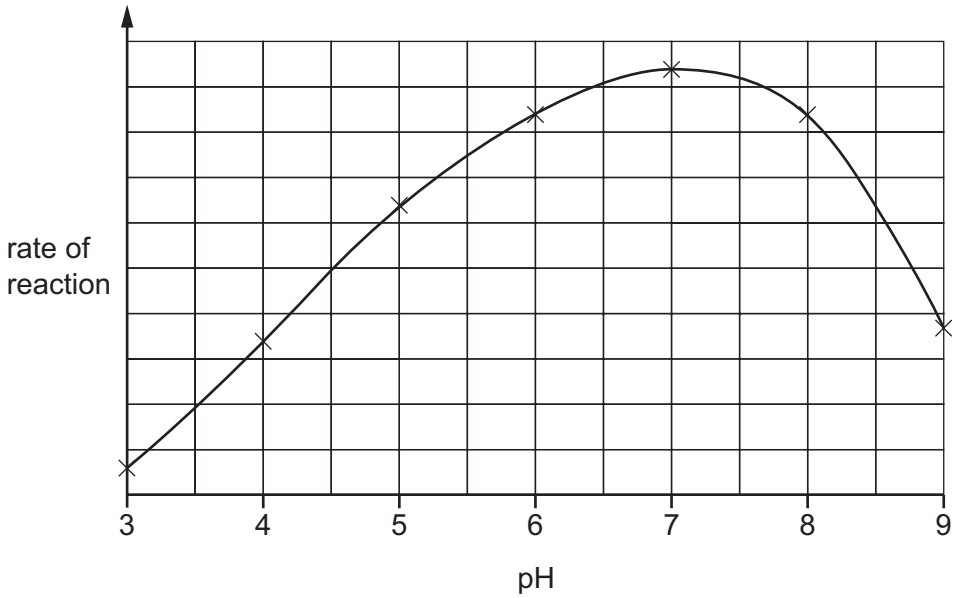
D starch, fats and oils

8 When bases pair up in the formation of DNA, what is one of the pairings?

A G with A **B** G with C **C** G with G **D** G with T

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9 The graph shows the effect of pH on the rate of reaction of an enzyme.



What does the graph show?

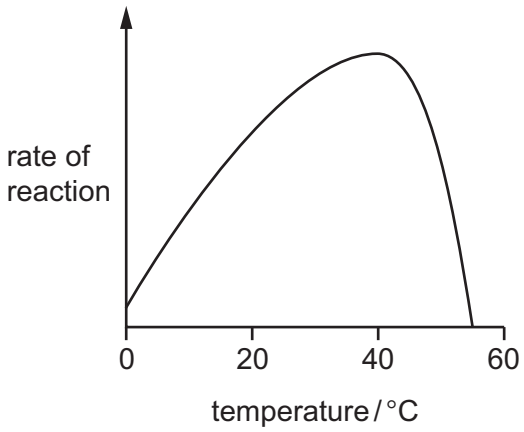
A The enzyme is destroyed at pH 9.

B The enzyme works best at pH 6.

C The rate of reaction halves as the pH changes from pH 5 to pH 7.

D The rate of reaction is the same at pH 5 and pH 8.5.

10 The graph shows how enzyme activity is affected by temperature.



How can the change in activity between 40 °C and 55 °C be explained?

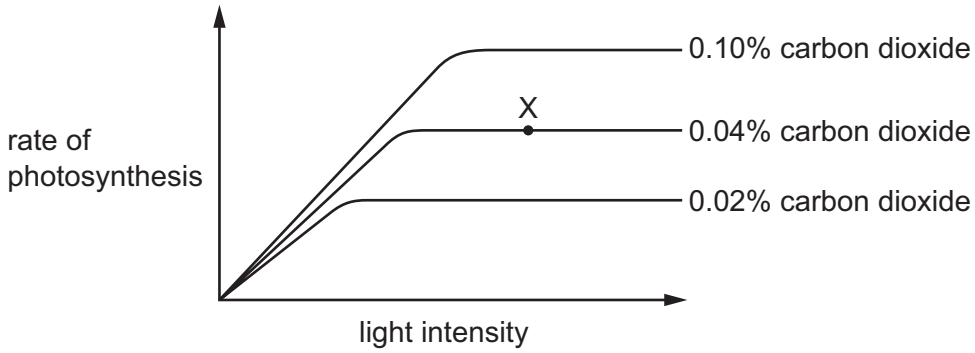
A Heat has killed the enzyme.

B The enzyme has been used up.

C The reactants are moving faster.

D The substrate is less likely to fit into the active site.

11 The graph shows how the rate of photosynthesis of a plant changes with light intensity, at three different carbon dioxide concentrations. In each case the temperature is 15 °C.



What is the limiting factor for the rate of photosynthesis at point X on the graph?

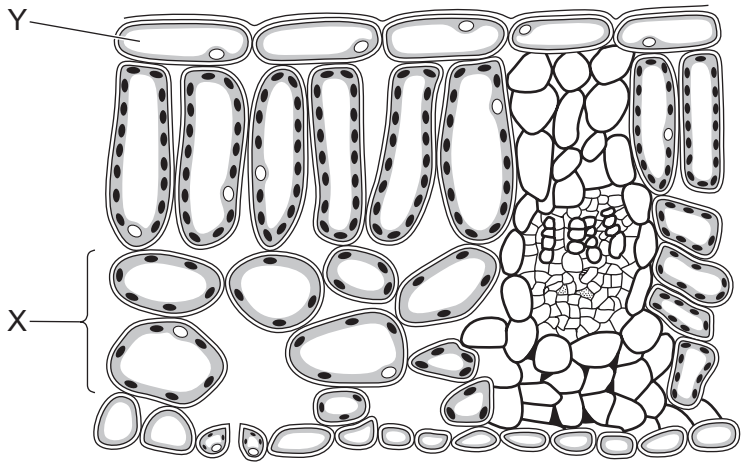
A carbon dioxide concentration

B light intensity

C surface area of the plant

D temperature

12 The diagram shows a section through a leaf.



Which row correctly identifies tissues X and Y?

	X	Y
A	palisade mesophyll	cuticle
B	palisade mesophyll	upper epidermis
C	spongy mesophyll	cuticle
D	spongy mesophyll	upper epidermis

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13 Which stage of nutrition takes place when food molecules become part of a body cell?

A absorption

B assimilation

C digestion

D ingestion

14 What is the definition of chemical digestion?

A Large insoluble molecules are changed into smaller soluble molecules.

B Large soluble molecules are changed into smaller soluble molecules.

C Small insoluble molecules and ions are passed through the wall of the small intestine.

D Small soluble molecules and ions are passed through the wall of the small intestine.

15 In which order does water pass through these structures in a plant?

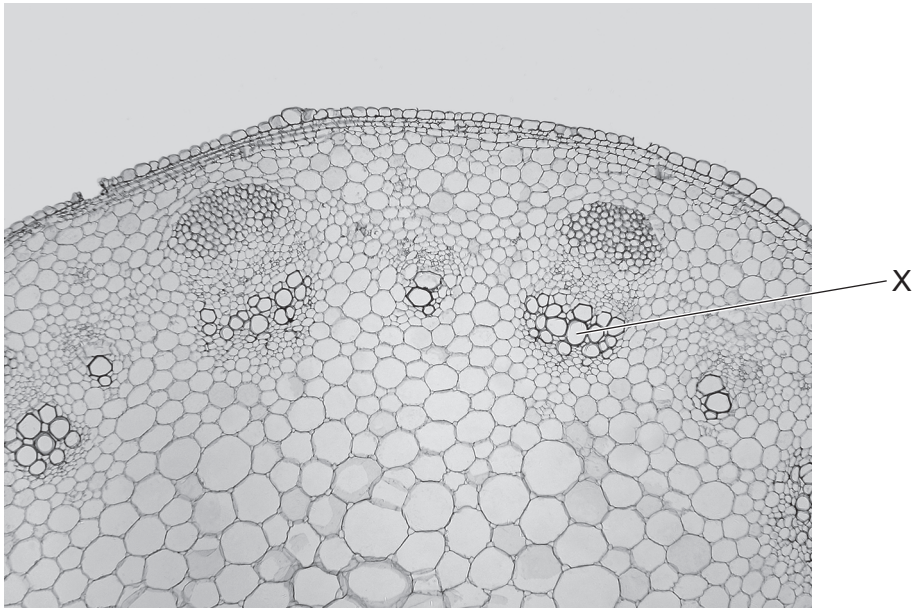
A mesophyll → root hair → xylem

B mesophyll → xylem → root hair

C root hair → mesophyll → xylem

D root hair → xylem → mesophyll

16 The photomicrograph shows a cross-section through a plant stem.



What is the name and function of the tissue labelled X?

	tissue	function
A	phloem	transports sugars
B	phloem	transports water and minerals
C	xylem	transports sugars
D	xylem	transports water and minerals

17 The table shows some features of blood vessels.

Which row shows the features of a vein?

	direction of blood flow	size of the central hole (lumen)	thickness of wall
A	away from the heart	large	thick
B	away from the heart	small	thick
C	towards heart	small	thin
D	towards heart	large	thin

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18 Where are valves found that prevent blood from flowing in the wrong direction?

A capillaries and arteries

B lungs and veins

C heart and capillaries

D heart and veins

19 The sequence of amino acids in antibodies enables them to complete which function?

A bind to a specific antigen

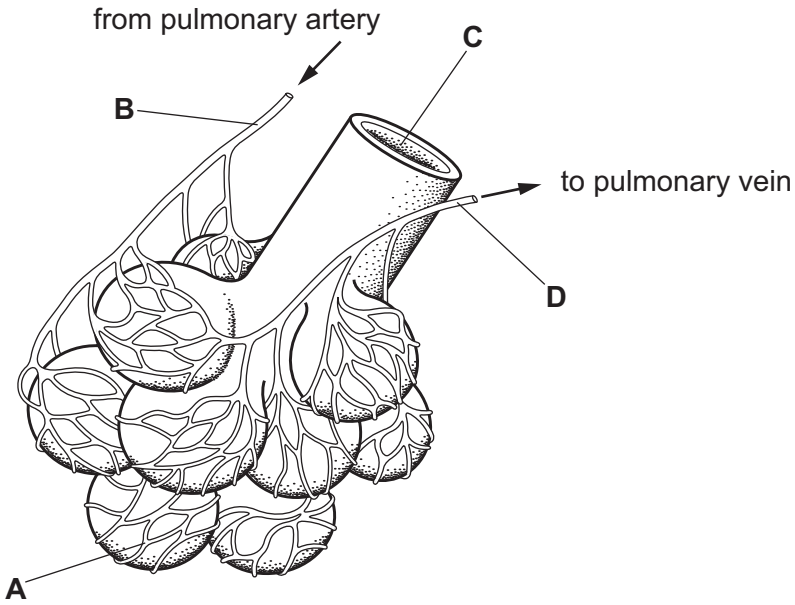
B bind to all pathogens

C perform phagocytosis

D confer passive immunity for all diseases

20 The diagram shows some of the structures in a human lung.

Where is the carbon dioxide concentration highest?



21 The list shows some processes that happen in the human body.

1 water enters cells by osmosis

2 muscles contract

3 impulses travel along neurones

4 oxygen diffuses into cells

Which of these require energy released by respiration?

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

22 The table shows the composition of blood entering and leaving the liver and the kidneys.

Which row is correct?

	highest concentration of urea in the blood	lowest concentration of urea in the blood
A	entering kidneys	leaving liver
B	entering kidneys	entering liver
C	leaving kidneys	entering liver
D	leaving kidneys	leaving liver

23 Which is the correct sequence of structures through which a nerve impulse passes in a reflex arc?

A effector → motor neurone → relay neurone → sensory neurone → receptor

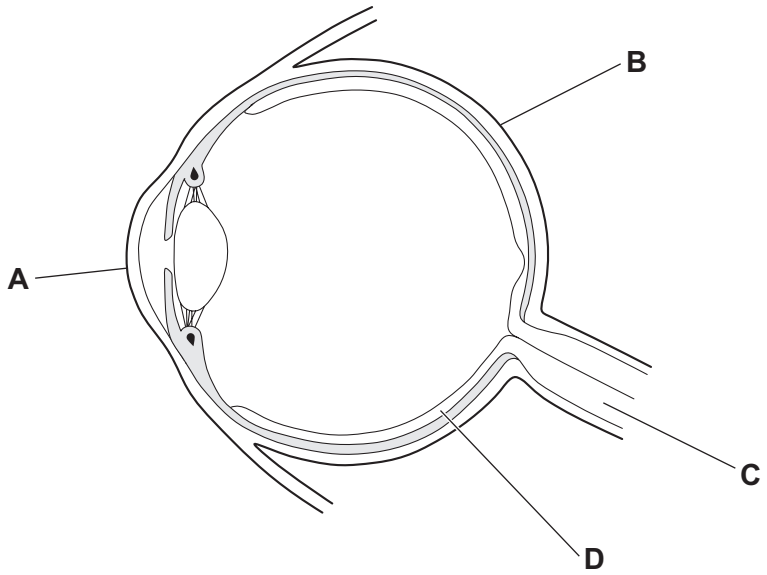
B effector → sensory neurone → relay neurone → motor neurone → receptor

C receptor → motor neurone → relay neurone → sensory neurone → effector

D receptor → sensory neurone → relay neurone → motor neurone → effector

24 The diagram shows an eye.

Which labelled part contains cells that are sensitive to light?



25 When hormones are secreted, they affect different parts of the body.

The table shows some features that are affected by four different hormones.

Which hormone is adrenaline?

	feature				
	pulse rate	blood glucose concentration	pupil size	menstrual cycle	sperm production
A	✓	✓	✗	✗	✗
B	✗	✗	✗	✗	✓
C	✓	✓	✓	✗	✗
D	✗	✗	✗	✓	✗

key
✓ = affected by hormone
✗ = not affected by hormone

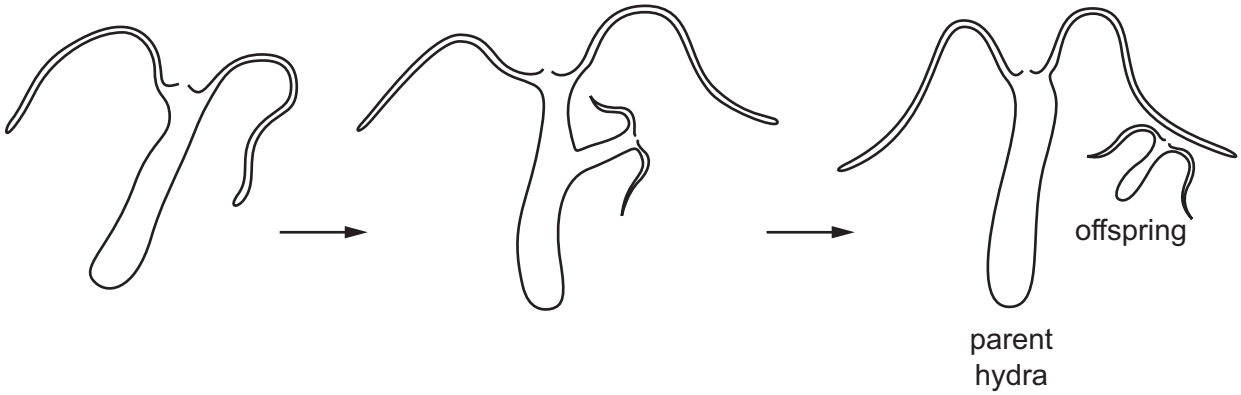
26 When the environment is hot, how do the arterioles in the skin and hair erector muscles react?

	arterioles	hair erector muscles
A	dilate	relax
B	dilate	contract
C	constrict	relax
D	constrict	contract

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[Turn over

27 The diagram shows one parent *Hydra* growing and releasing an offspring from the side of its body.



Which row is correct?

	parent and offspring are genetically identical	involves asexual reproduction
A	✓	✓
B	✓	✗
C	✗	✓
D	✗	✗

key
✓ = yes
✗ = no

28 Which row describes self-pollination?

	pollen transferred from anther to stigma of		
	a different flower on the same plant	a flower on a different plant of the same species	same flower
A	✓	✓	✗
B	✓	✗	✓
C	✗	✗	✓
D	✗	✓	✓

key
✓ = yes
✗ = no

29 Which feature is only found in the male gamete?

A acrosome

B enzymes

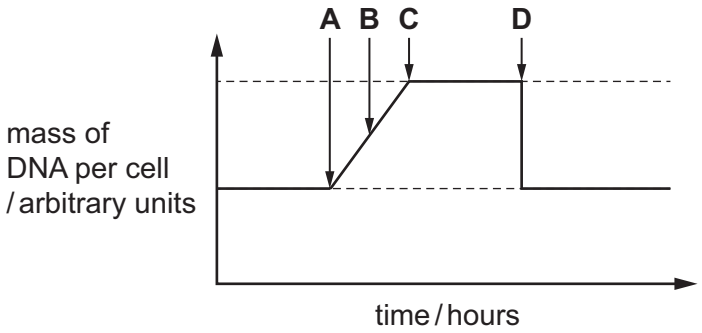
C jelly coat

D mitochondria

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30 The graph shows how the mass of DNA changes during a mitotic cell division.

Where on the graph are two cells formed?



31 What happens during meiosis?

A A diploid cell divides to form diploid cells.

B A diploid cell divides to form haploid cells.

C A haploid cell divides to form diploid cells.

D A haploid cell divides to form haploid cells.

32 Red-green colour blindness is a condition that occurs more frequently in men than in women.

Which statement about this condition is correct?

A It can pass from father to son.

B It is a sex-linked characteristic.

C It shows co-dominance.

D The gene is on the Y chromosome.

33 Which statement explains why the allele for sickle-cell anaemia is commonly found in human populations in certain parts of the world?

A It is transmitted by mosquitoes.

B It protects people against malaria.

C It prevents people being bitten by mosquitoes.

D It increases oxygen transport.

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34 The development of antibiotic resistance in bacteria is an example of which process?

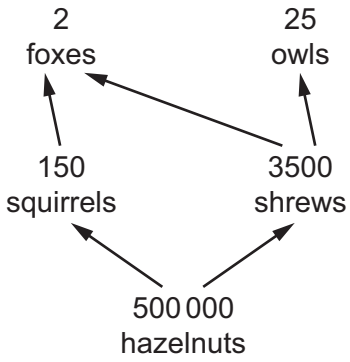
A evolution by artificial selection

B evolution by natural selection

C variation due to genetic engineering

D variation due to asexual reproduction

35 The diagram contains information about the number and mass of organisms in a food web.



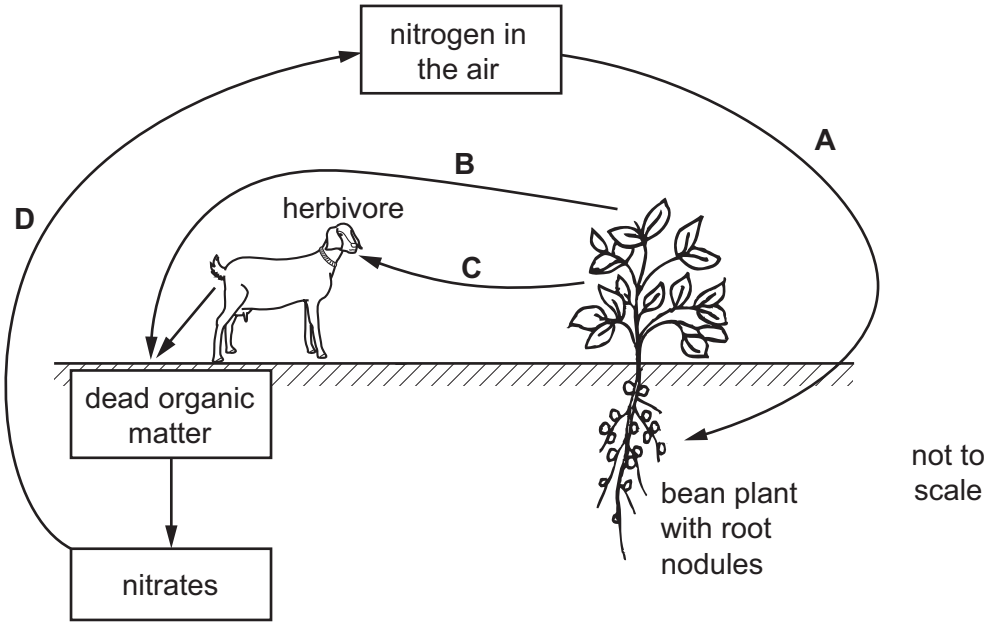
organism	average mass / g
fox	13 000
hazelnut	3
shrew	20
owl	600
squirrel	400

What is the total biomass of all the primary consumers in this food web?

A 130 kg **B** 420 kg **C** 3650 kg **D** 130 000 kg

36 The diagram shows some of the stages in the nitrogen cycle.

Which arrow represents the process of nitrogen fixation?



37 Which term is used to describe the phase of fastest growth in a population of bacteria?

A stationary

B lag

C exponential

D sigmoid

38 Which are reasons why bacteria are often useful in biotechnology?

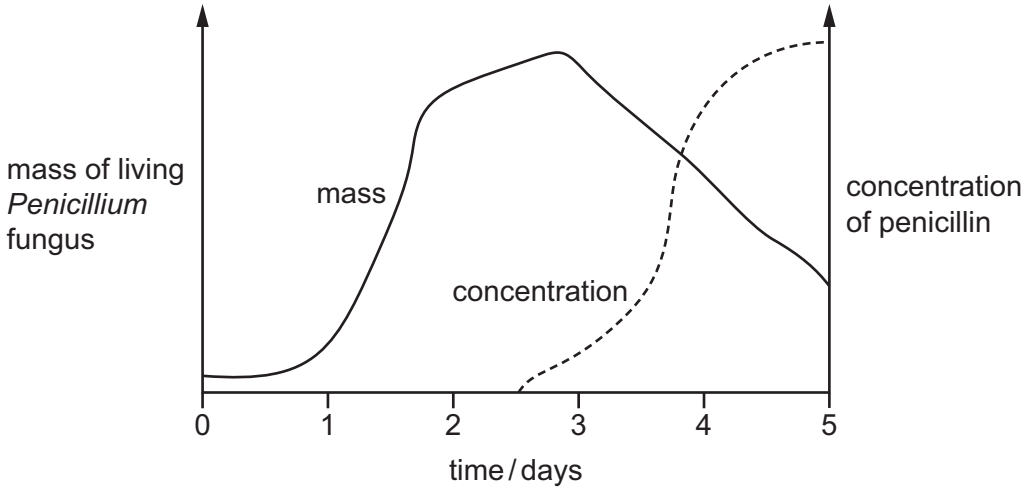
1 lack of ethical concerns over their manipulation and growth

2 they have the same genetic code as all other organisms

3 their DNA is located in a nucleus that can easily be altered with enzymes

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

39 Penicillin is produced in a fermenter by growing the fungus *Penicillium*. The graph shows how the mass of living *Penicillium* fungus and the concentration of penicillin changed over time.



When is the best time to collect the penicillin?

A at 1.5 days

B at 3 days

C at 3.5 days

D at 5 days

40 The number of Atlantic bluefin tuna fish found in the Atlantic Ocean has significantly decreased in the last 50 years.

Which method would make the biggest improvement in the conservation of tuna fish stocks?

A decreasing the size of holes in fishing nets

B genetic engineering of tuna

C introducing fishing quotas

D selective breeding of tuna

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