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.

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.



IB20 11_0610_21/3RP
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**1** Hedgehogs are mammals. Touching a hedgehog causes it to roll into a ball to protect itself.

View solution

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?

View solution

| | broad leaves | parallel veins |
|---|---|---|
| **A** | ✓ | ✓ |
| **B** | ✓ | ✗ |
| **C** | ✗ | ✓ |
| **D** | ✗ | ✗ |

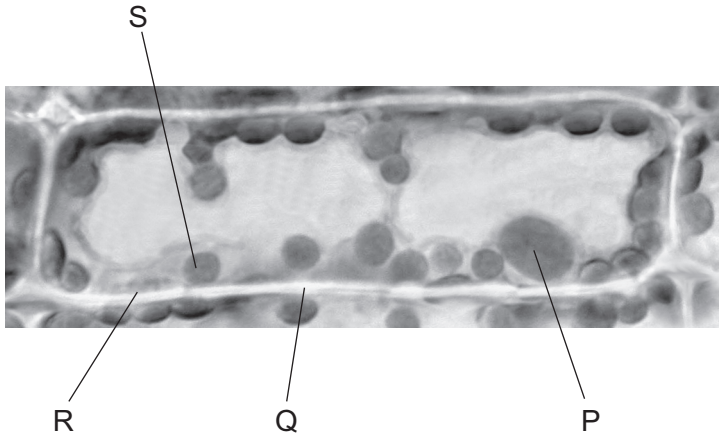
key

✓ = yes

✗ = no

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

View solution




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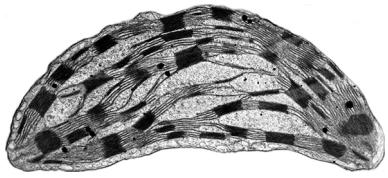
**4** The diagram shows an image of a chloroplast. The image is 5 cm long.

View solution



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?

View solution

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

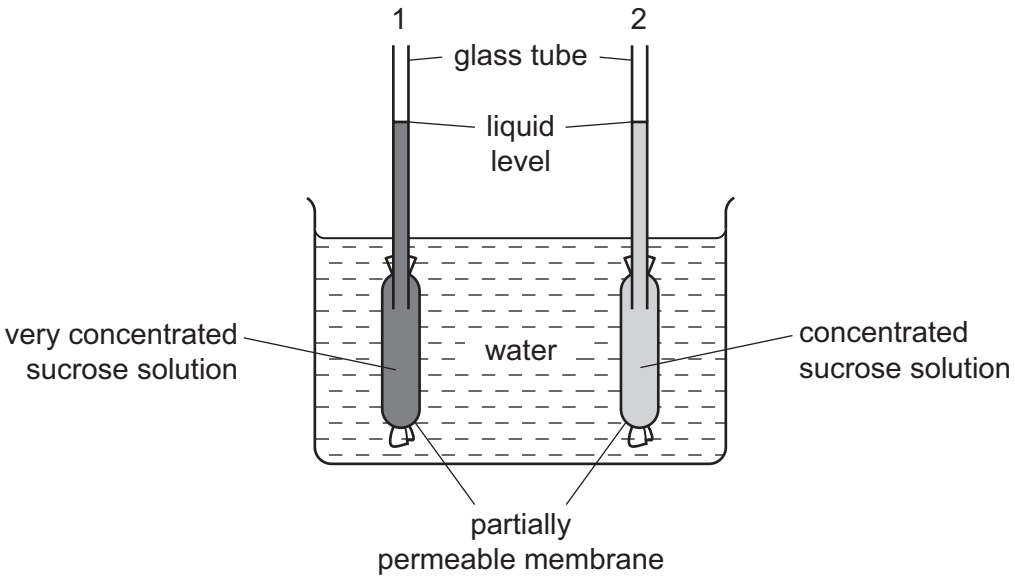
key

✓ = yes

✗ = no

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

View solution




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 |

View solution

**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

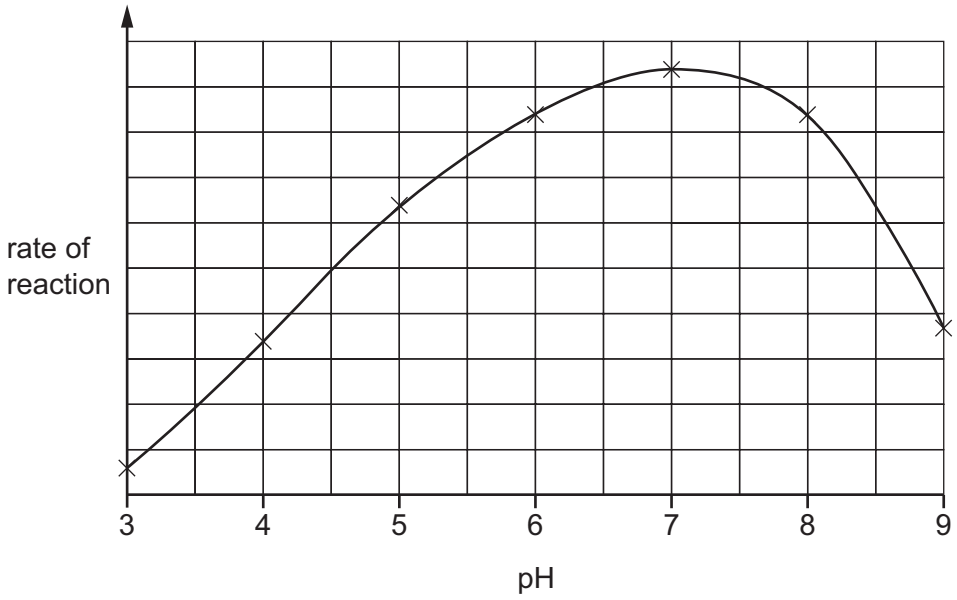
View solution

**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

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

View solution




What does the graph show?

**A** The enzyme is destroyed at pH 9.

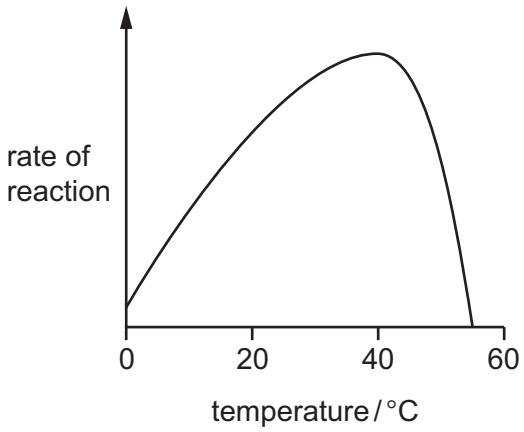
**B** The enzyme works best at pH 6.

**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.

View solution




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.

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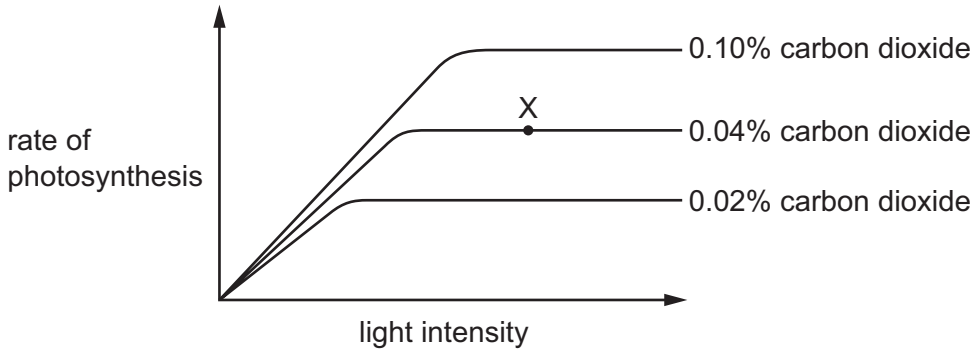
**11** The graph shows how the rate of photosynthesis of a plant changes with light intensity, at three different carbon dioxide concentrations. In each case the temperature is 15 °C.

View solution




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

**A** carbon dioxide concentration

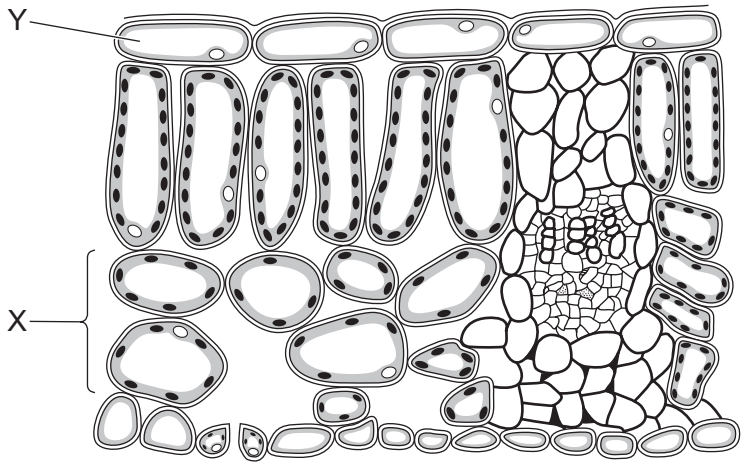
**B** light intensity

**C** surface area of the plant

**D** temperature

**12** The diagram shows a section through a leaf.

View solution




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?

View solution

**A** absorption

**B** assimilation

**C** digestion

**D** ingestion

**14** What is the definition of chemical digestion?

View solution

**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?

View solution

**A** mesophyll → root hair → xylem

**B** mesophyll → xylem → root hair

**C** root hair → mesophyll → xylem

**D** root hair → xylem → mesophyll

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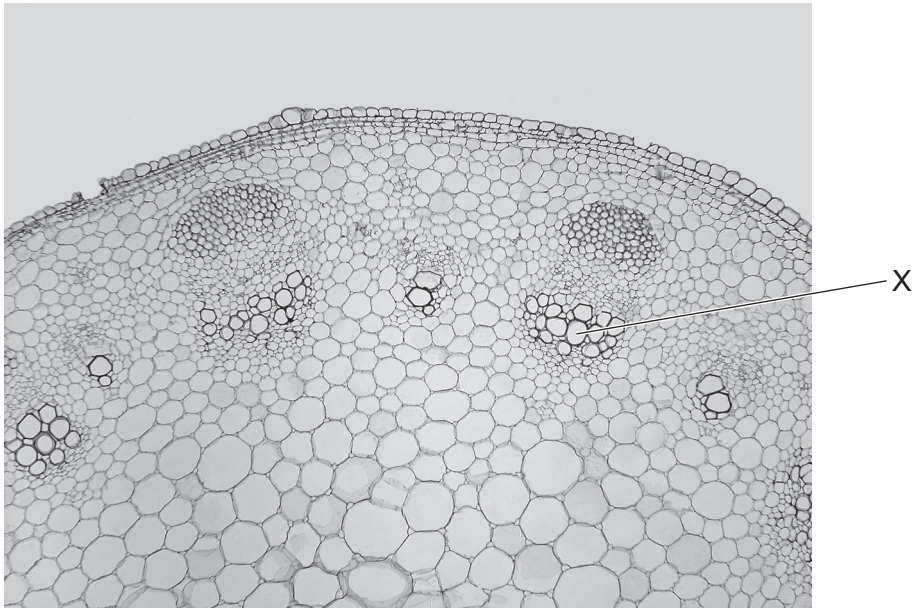
**16** The photomicrograph shows a cross-section through a plant stem.

View solution




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 |

View solution

**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?

View solution

**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?

View solution

**A** bind to a specific antigen

**B** bind to all pathogens

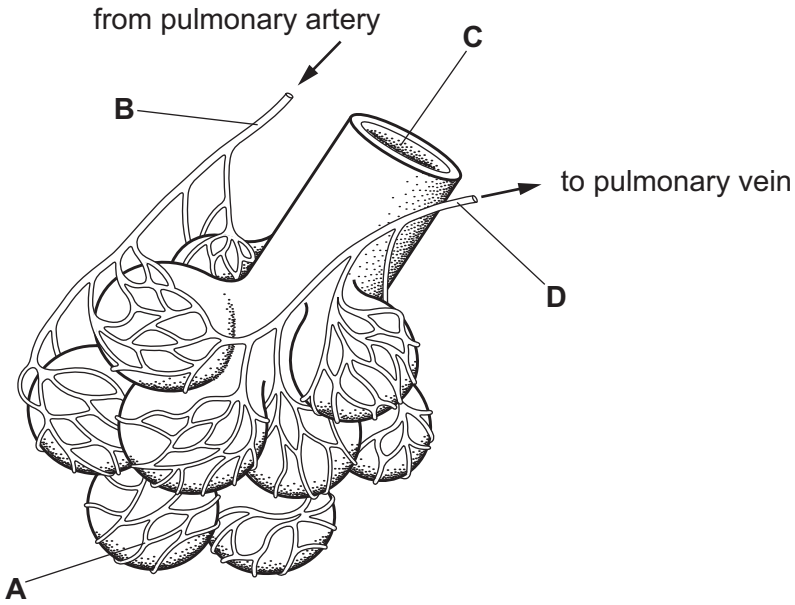
**C** perform phagocytosis

**D** confer passive immunity for all diseases

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

View solution

Where is the carbon dioxide concentration highest?




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

View solution

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

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

View solution

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?

View solution

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

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

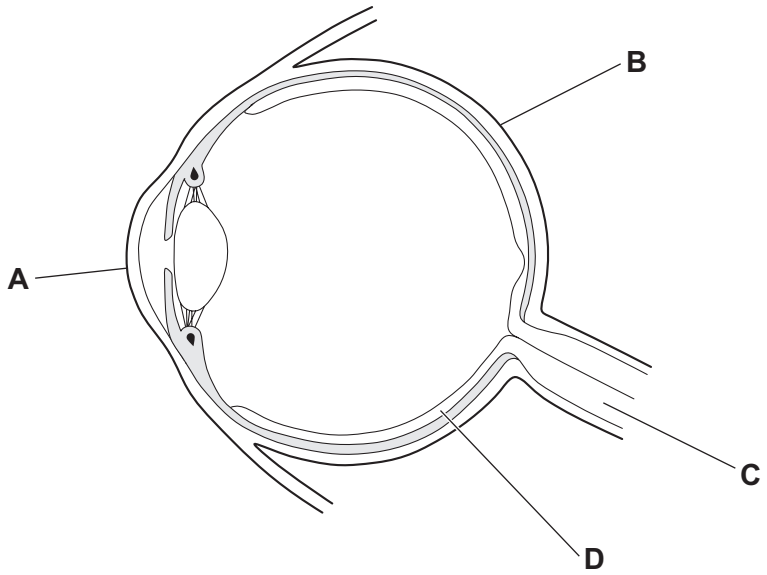
**C** receptor → motor neurone → relay neurone → sensory neurone → effector

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

**24** The diagram shows an eye.

View solution

Which labelled part contains cells that are sensitive to light?



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

View solution

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?

View solution

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

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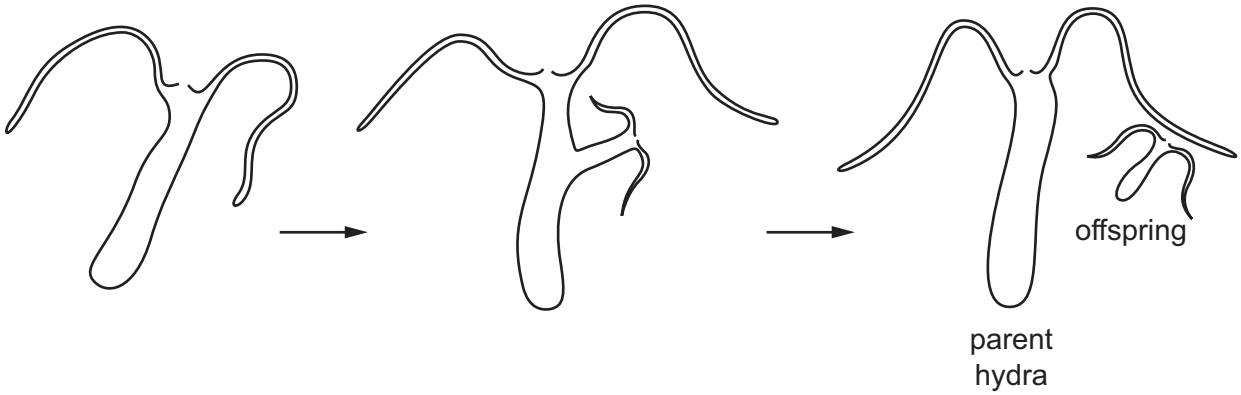
**27** The diagram shows one parent *Hydra* growing and releasing an offspring from the side of its body.

View solution




Which row is correct?

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

key
✓ = yes
✗ = no

View solution

**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

View solution

**29** Which feature is only found in the male gamete?

**A** acrosome

**B** enzymes

**C** jelly coat

**D** mitochondria

View solution

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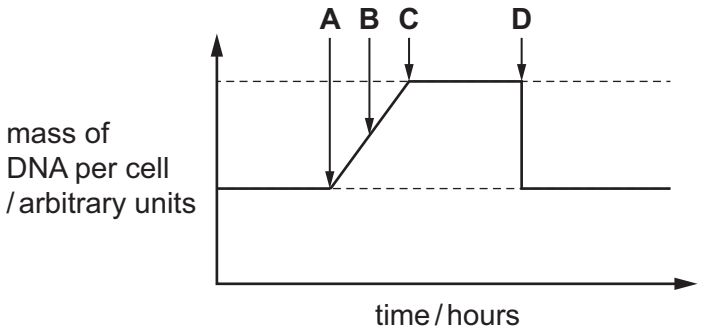
**30** The graph shows how the mass of DNA changes during a mitotic cell division.

View solution

Where on the graph are two cells formed?




**31** What happens during meiosis?

View solution

**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.

View solution

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?

View solution

**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?

View solution

**A** evolution by artificial selection

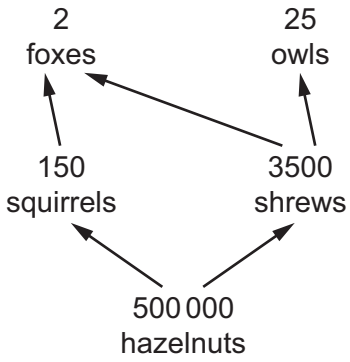
**B** evolution by natural selection

**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.

View solution




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

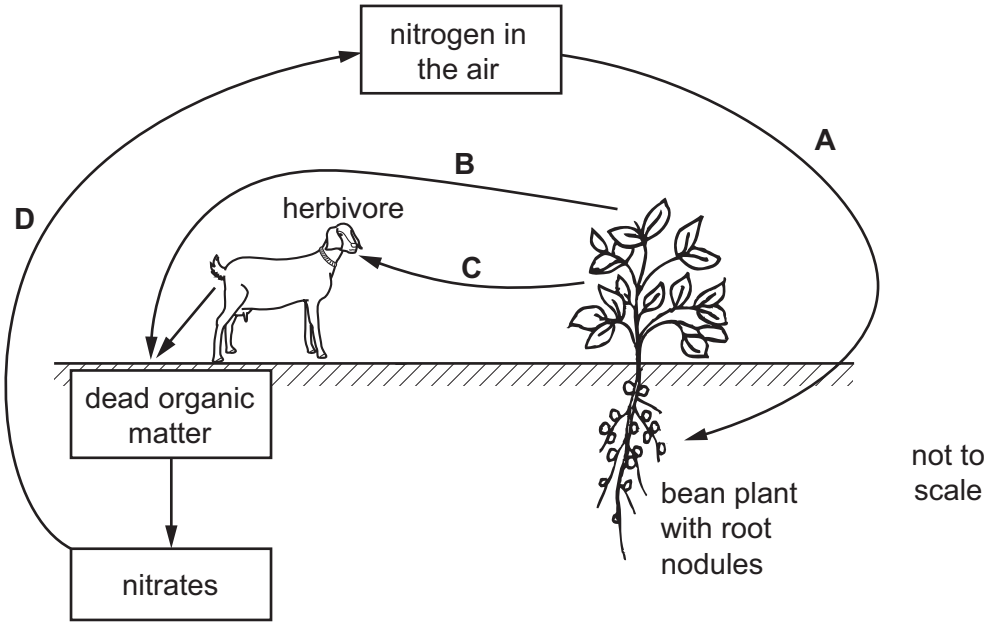
What is the total biomass of all the primary consumers in this food web?

**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.

View solution

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?

View solution

**A** stationary

**B** lag

**C** exponential

**D** sigmoid

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

View solution

1 lack of ethical concerns over their manipulation and growth

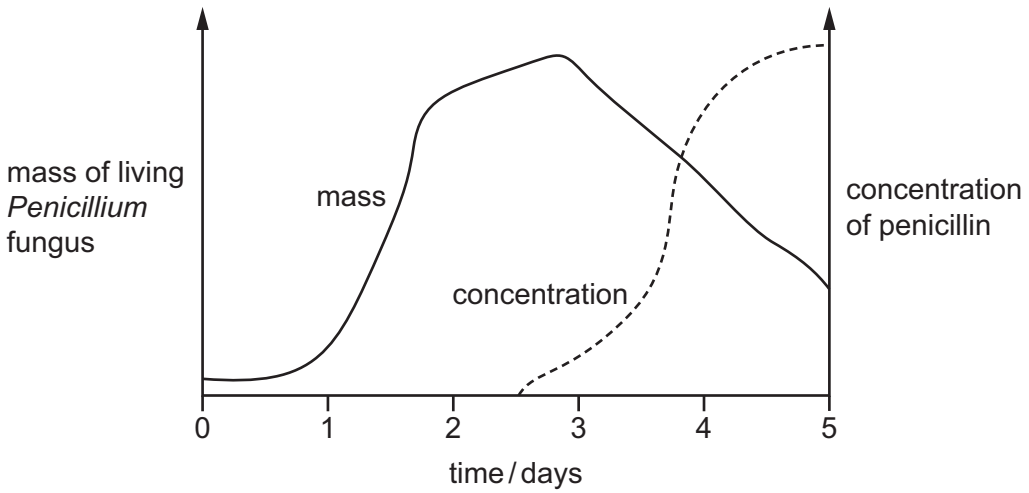
2 they have the same genetic code as all other organisms

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.

View solution




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

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

View solution

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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