

CAMBRIDGE INTERNATIONAL EXAMINATIONS
General Certificate of Education Ordinary Level

BIOLOGY

5090/01

Paper 1 Multiple Choice

May/June 2003

50 minutes

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

READ THESE INSTRUCTIONS FIRST

Write in soft pencil.

Do not use staples, paper clips, highlighters, 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.

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.

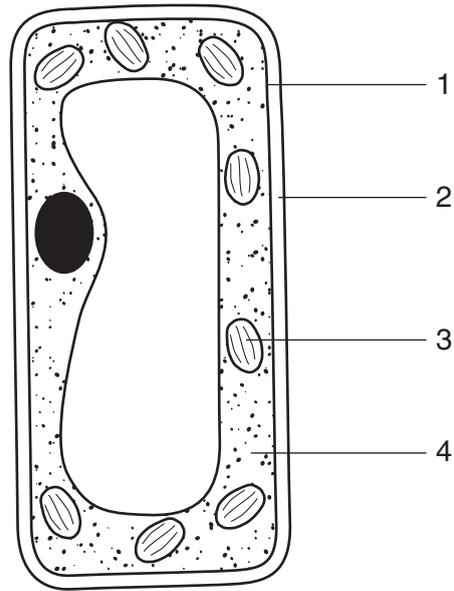
Read the instructions on the Answer Sheet very carefully.

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.

This document consists of **20** printed pages.



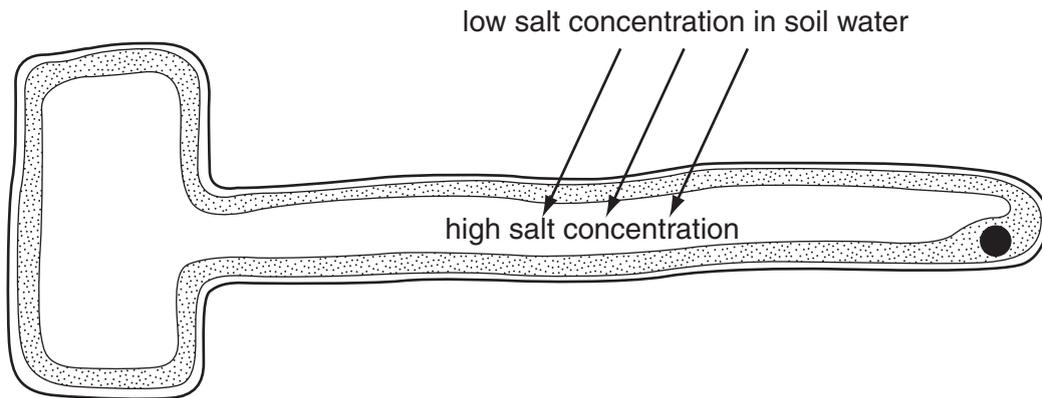
1 The diagram shows a cell.



Which numbers show the parts named?

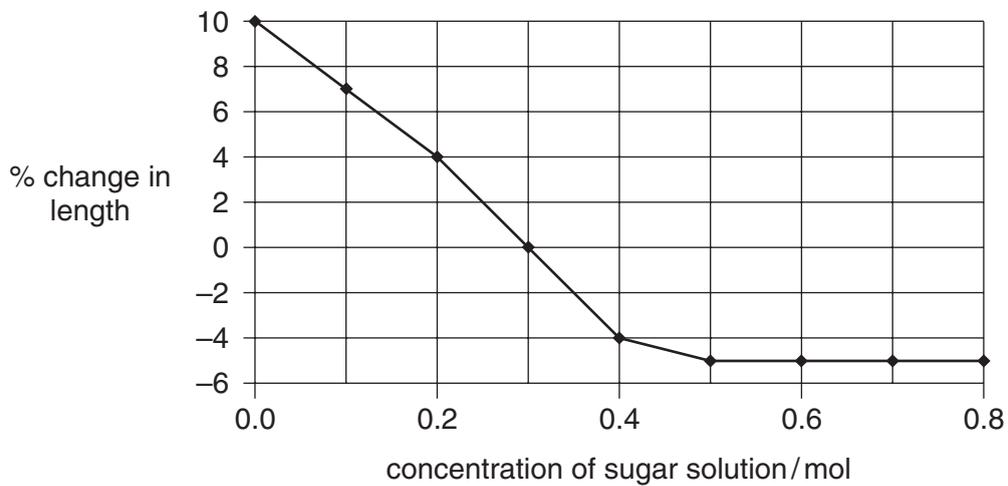
| | cell membrane | cell wall | cytoplasm |
|----------|---------------|-----------|-----------|
| A | 1 | 2 | 3 |
| B | 1 | 2 | 4 |
| C | 2 | 1 | 3 |
| D | 2 | 1 | 4 |

- 2 The arrows show the movement of salts into a cell.



Which describes the movement of the salts?

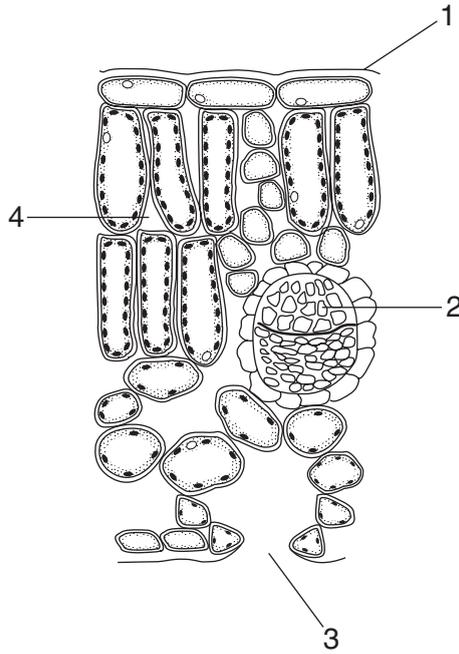
- A active transport against the concentration gradient
 B active transport down the concentration gradient
 C diffusion against the concentration gradient
 D diffusion down the concentration gradient
- 3 Cylinders of potato tissue were placed in different concentrations of a sugar solution. The graph shows the percentage change in length of the cylinders of potato tissue.



Which solution has the same water potential as the potato tissue?

- A 0.0 mol
 B 0.2 mol
 C 0.3 mol
 D 0.5 mol

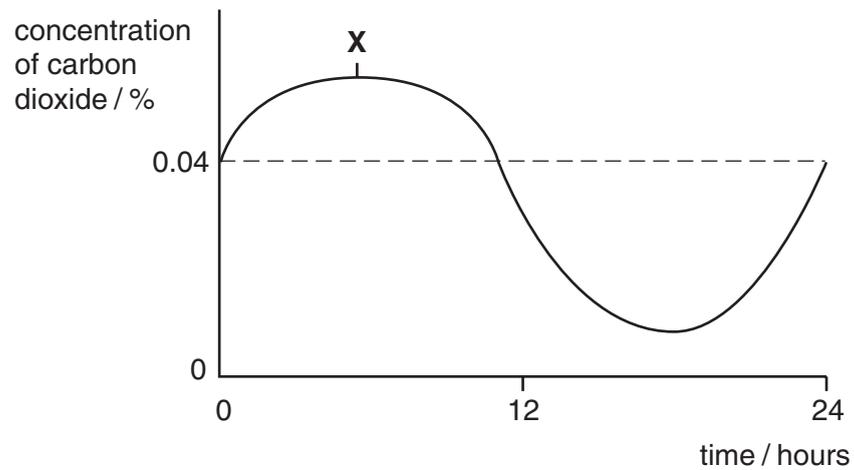
- 4 As a seed begins to germinate, it uses enzymes to speed up the rate of
- A digestion.
 - B osmosis.
 - C photosynthesis.
 - D transpiration.
- 5 The diagram shows a cross-section of a leaf.



Where in the leaf does gaseous exchange occur?

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

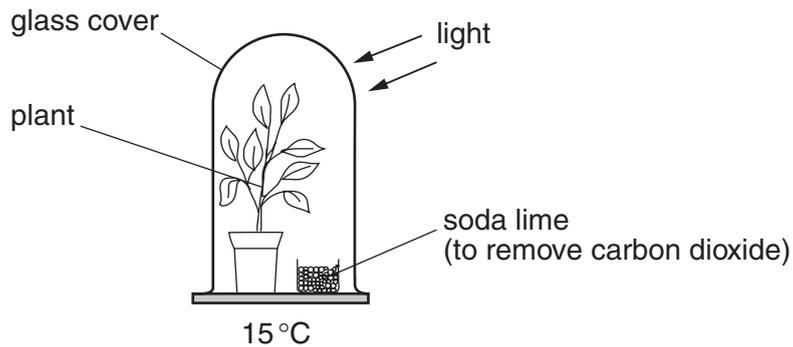
- 6 The graph shows the concentration of carbon dioxide in the air surrounding a plant measured over 24 hours.



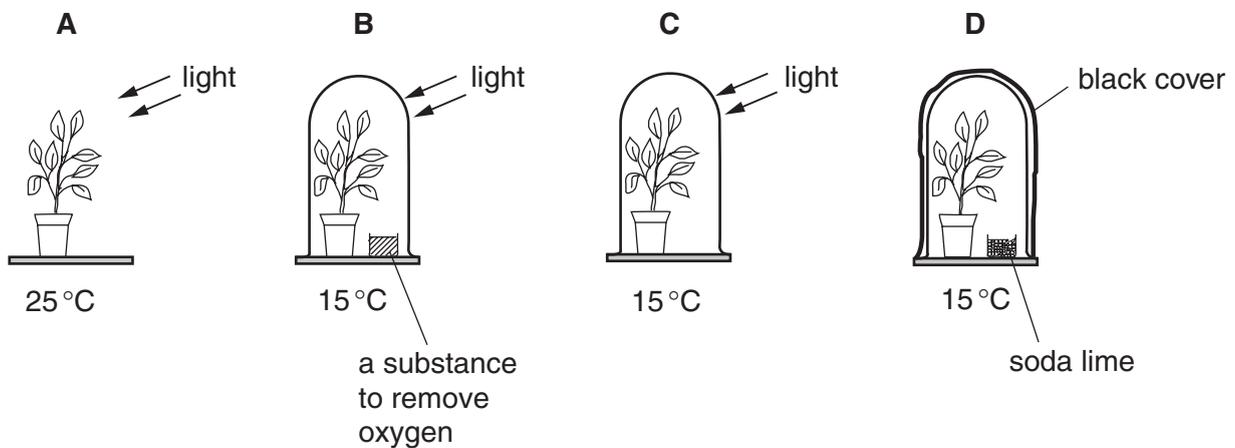
Which explains the carbon dioxide concentration at time **X**?

| | light intensity | plant process |
|----------|-----------------|----------------|
| A | darkness | respiration |
| B | darkness | transpiration |
| C | daylight | photosynthesis |
| D | daylight | respiration |

- 7 The diagram shows an experiment to find out whether carbon dioxide is needed for photosynthesis.



Which is the most suitable control for this experiment?



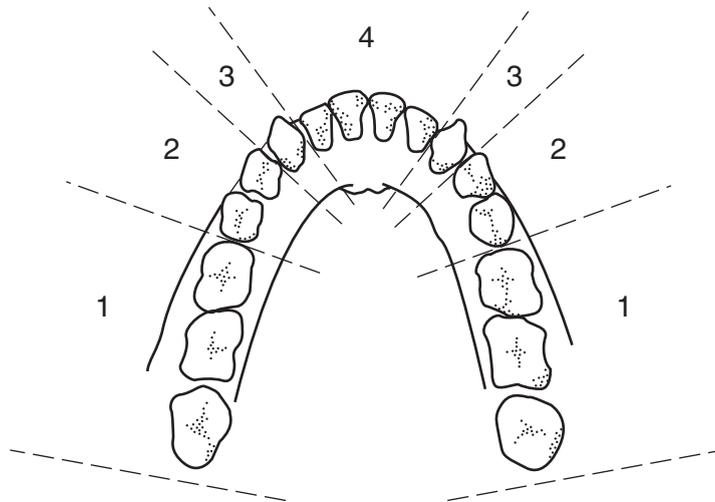
- 8 Where in the alimentary canal is most water absorbed?

- A colon
- B ileum
- C oesophagus
- D stomach

- 9 Which food would be best for a person suffering from anaemia?

| | food | iron / mg per per 100 g of food | calcium / mg per 100 g of food | vitamin C / mg per 100 g of food | vitamin D / mg per 100 g of food |
|---|---------|---------------------------------|--------------------------------|----------------------------------|----------------------------------|
| A | bananas | 0.4 | 7 | 10 | 0 |
| B | fish | 0.4 | 28 | 0 | 6.38 |
| C | lentils | 7.6 | 39 | 0 | 0 |
| D | milk | 0.1 | 120 | 0.5 | 0.002 |

10 The diagram shows the arrangement of teeth in the human jaw.



Which types of teeth are found in the numbered parts of the jaw?

| | 1 | 2 | 3 | 4 |
|----------|----------|----------|---------|---------|
| A | molar | premolar | canine | incisor |
| B | molar | premolar | incisor | canine |
| C | premolar | molar | canine | incisor |
| D | premolar | molar | incisor | canine |

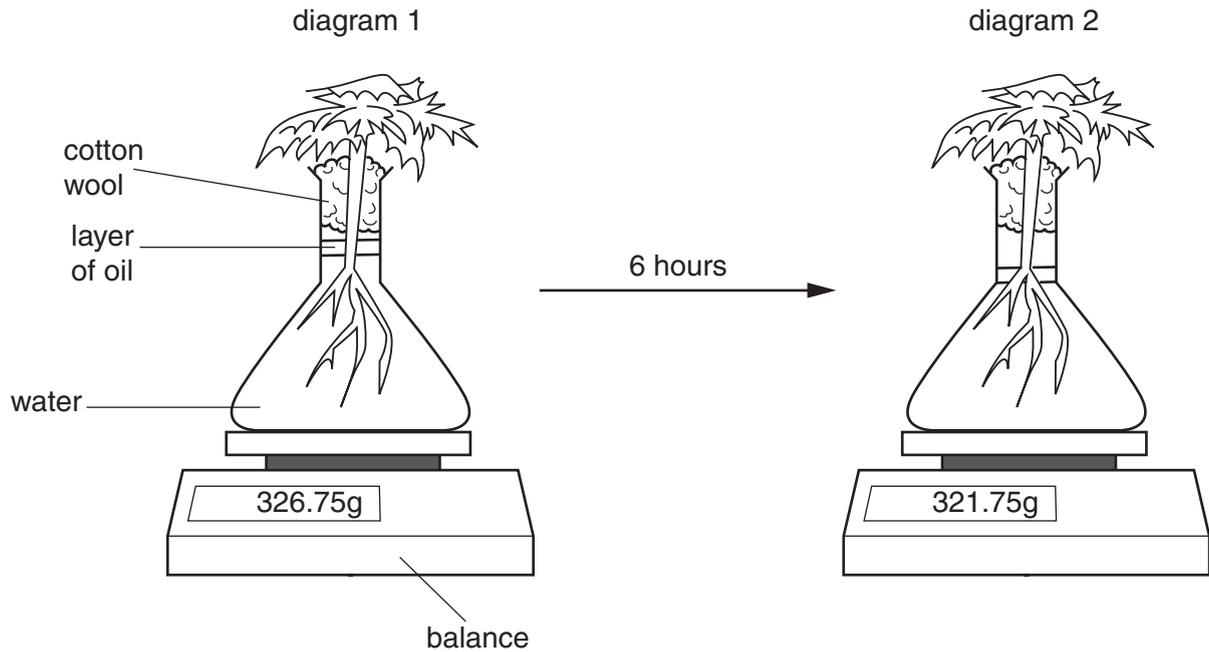
11 Milk produces a red precipitate when heated with Benedict's solution.

A purple colour develops when the biuret test is used on milk.

Using these results **only**, which nutrients does milk contain?

- A** fat and protein
- B** fat and starch
- C** reducing sugar and protein
- D** reducing sugar and starch

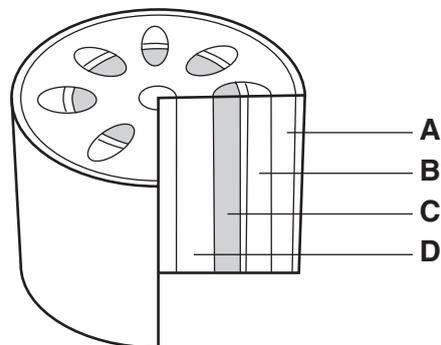
- 12 The diagrams show a plant in a flask of water. It is left for six hours on a warm and windy day in bright sunshine.



Which process explains the result shown in diagram 2?

- A active transport of water into the root hairs
 - B evaporation of water from the flask
 - C photosynthesis in the leaves of the plant
 - D transpiration from the leaves of the plant
- 13 The diagram shows a section of a stem.

Which tissue transports sugars and amino acids from the leaves to other parts of the plant?



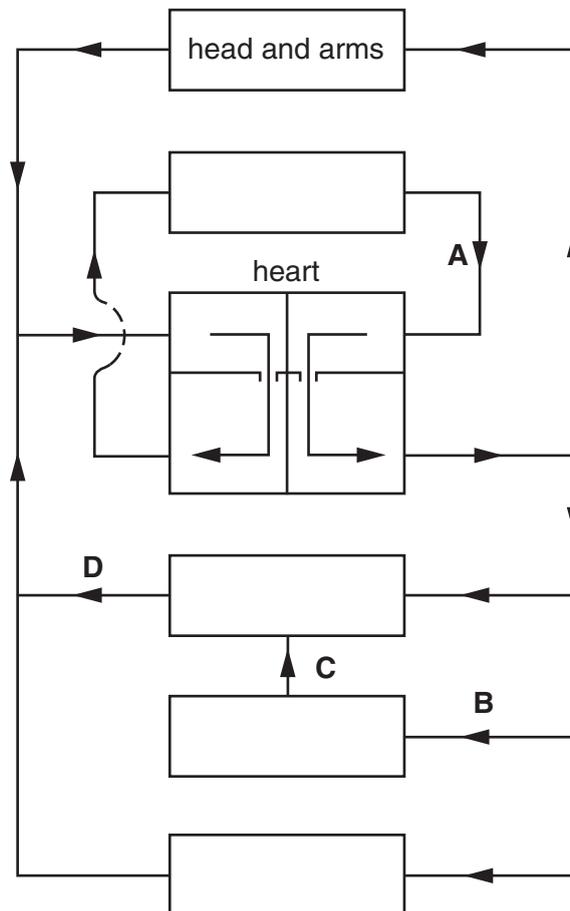
14 When the skin is cut the blood forms clots.

In which order would the components of the blood become involved?

| | first → last | | | |
|----------|---|----------------|----------------|----------------|
| A | fibrin | platelet | red blood cell | fibrinogen |
| B | fibrinogen | red blood cell | platelet | fibrin |
| C | platelet | fibrin | fibrinogen | red blood cell |
| D | platelet | fibrinogen | fibrin | red blood cell |

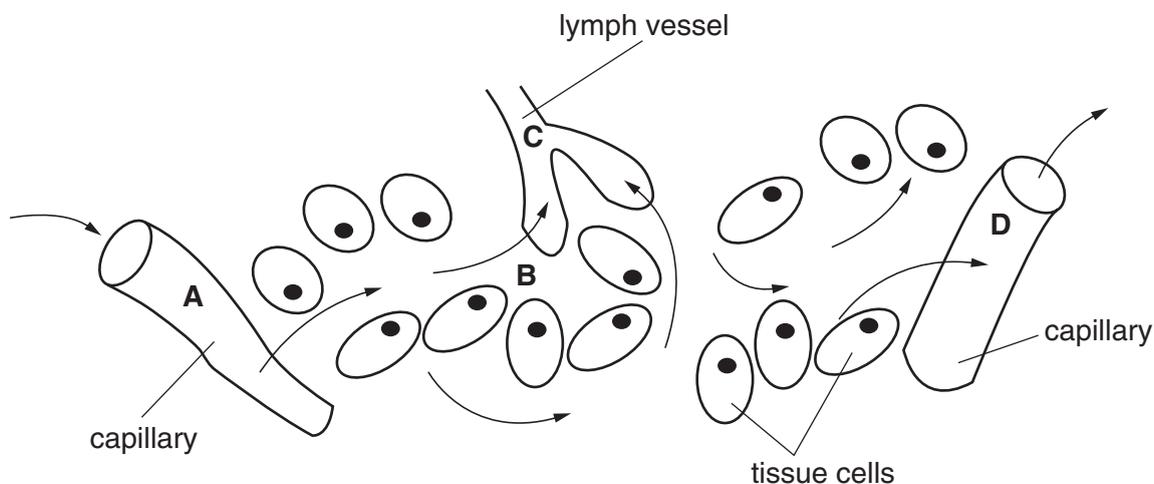
15 The diagram shows the human circulatory system.

Which arrow is the hepatic portal vein?



16 The diagram shows part of a tissue. The arrows show movement of fluids.

At which point is the pressure highest?



17 The table shows movements involved in breathing.

Which describes the movements involved in breathing out?

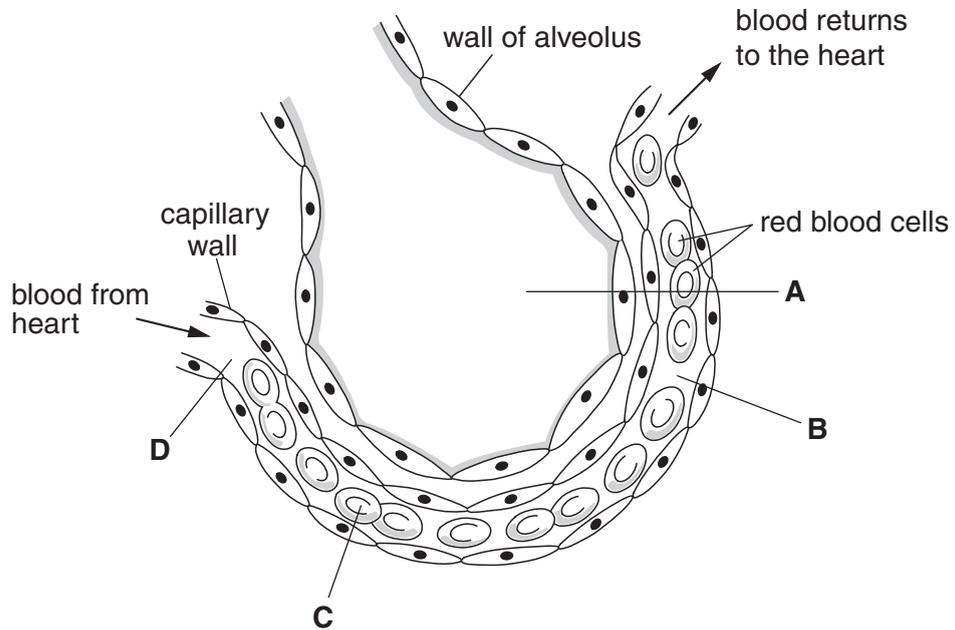
| | movement of ribs | movement of diaphragm |
|----------|------------------|-----------------------|
| A | down and in | downwards |
| B | down and in | upwards |
| C | up and out | downwards |
| D | up and out | upwards |

18 What are some of the end products and effects of anaerobic respiration in muscle?

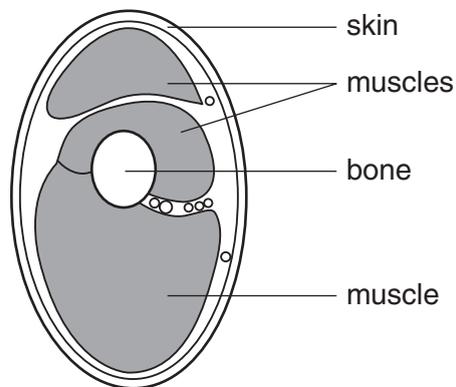
- A** carbon dioxide and muscle contraction
- B** ethanol and loss of coordination
- C** lactic acid and oxygen debt
- D** water and muscle relaxation

19 The diagram shows a section through an alveolus and an associated blood capillary.

In which part is the concentration of carbon dioxide highest?



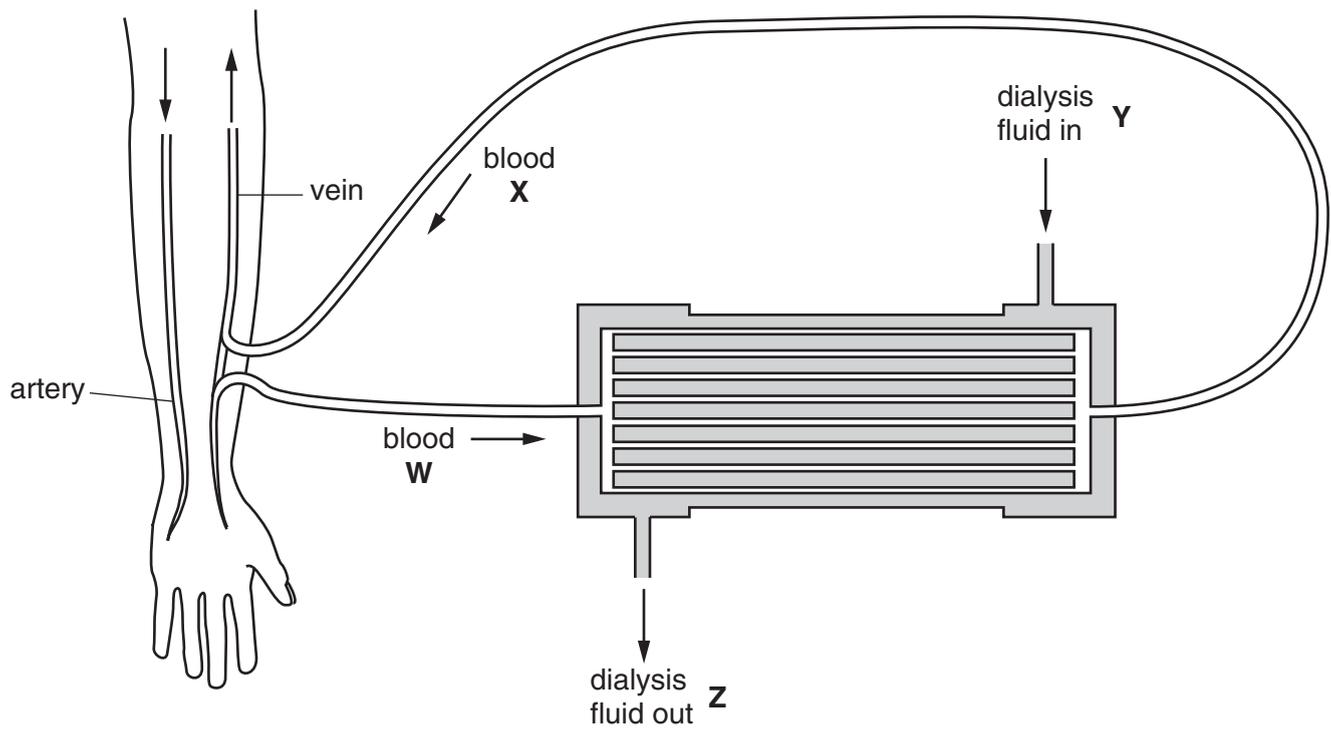
20 The diagram shows a cross-section through the arm of a human.



What is the name of the bone?

- A humerus
- B radius
- C scapula
- D ulna

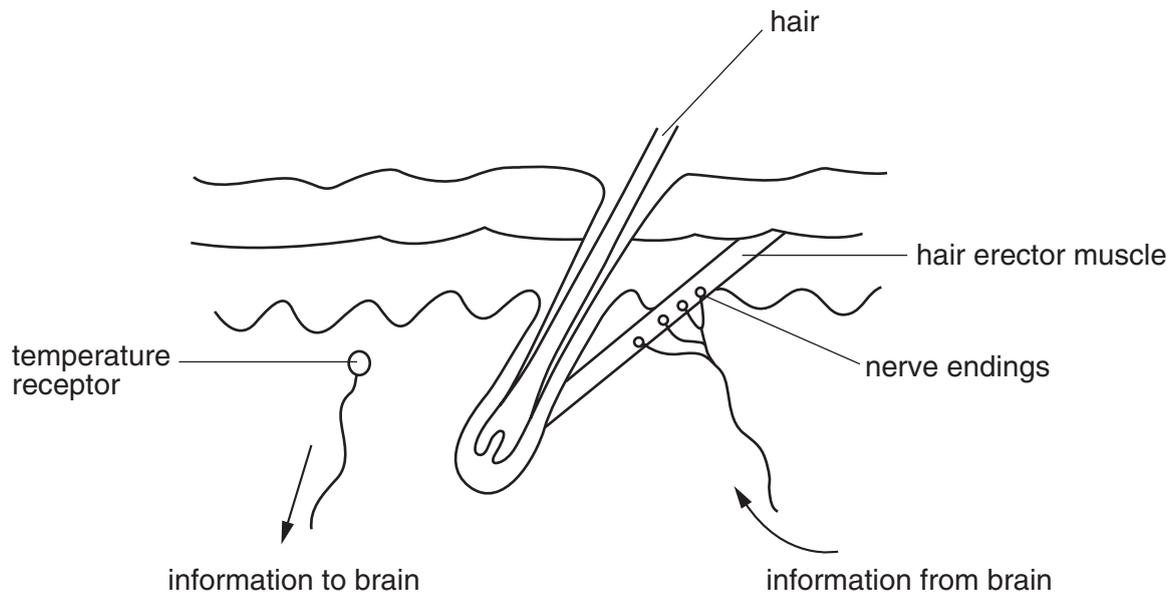
21 The diagram shows the flow of blood and dialysis fluid through a kidney machine.



Where would the concentration of urea be highest?

- A W and X
- B X and Y
- C Y and Z
- D Z and W

22 The diagram shows some of the features of human skin.



Which part of the brain co-ordinates the information labelled in the diagram?

- A cerebrum
- B cerebellum
- C hypothalamus
- D medulla

23 What effects would an increase in adrenaline have on the body?

| | concentration of glycogen in the liver | concentration of glucose in the blood |
|---|--|---------------------------------------|
| A | decrease | increase |
| B | increase | increase |
| C | no effect | decrease |
| D | increase | no effect |

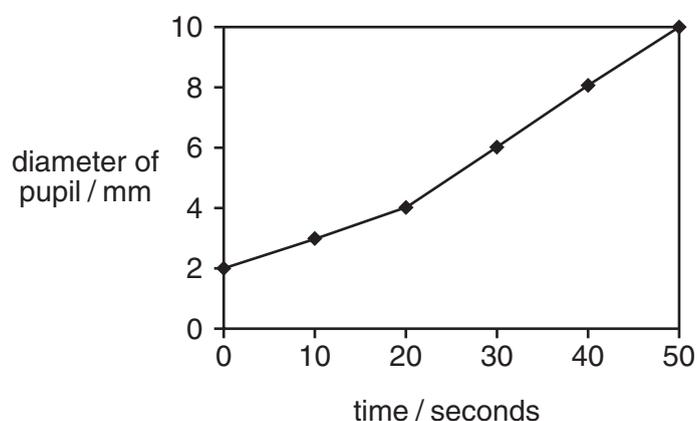
24 What causes emphysema?

- A blockage of the bronchioles
- B destruction of the alveolar walls
- C inflammation of the walls of the airways
- D overproduction of mucus

- 25 Which combination of responses in the skin shows that temperature receptors are being stimulated by cold conditions?

| | hair erector muscles | arterioles to surface capillaries |
|----------|----------------------|-----------------------------------|
| A | contract | dilate |
| B | relax | constrict |
| C | contract | constrict |
| D | relax | dilate |

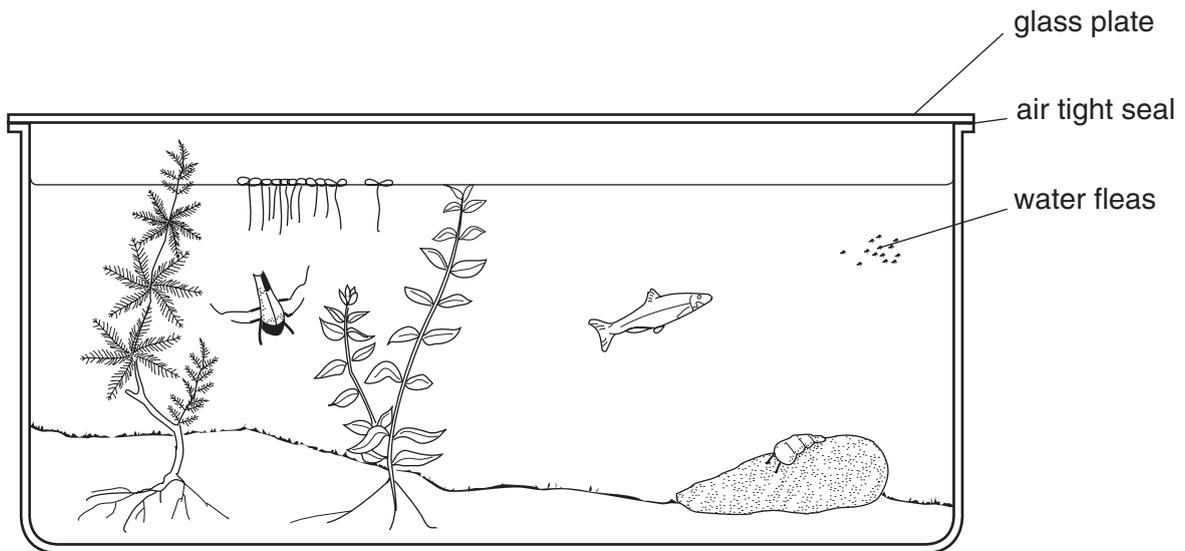
- 26 A light of varying intensity was shone into a person's eye for 50 seconds. The graph shows changes in pupil size as the light intensity was changed.



Which statement explains the change in pupil size?

- A** The light slowly became brighter.
B The light suddenly became brighter.
C The light slowly became dimmer.
D The light suddenly became dimmer.
- 27 What benefit does yeast gain from carrying out fermentation?
- A** carbon dioxide is available for photosynthesis
B energy is available for growth
C ethanol is available for growth
D glucose is available for respiration

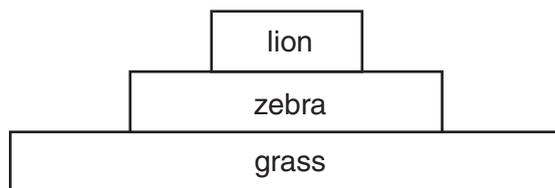
28 The diagram shows some animals and green plants sealed in an aquarium.



What must be supplied to keep the organisms alive for the longest possible time?

- A carbon dioxide
- B light energy
- C nitrates
- D oxygen

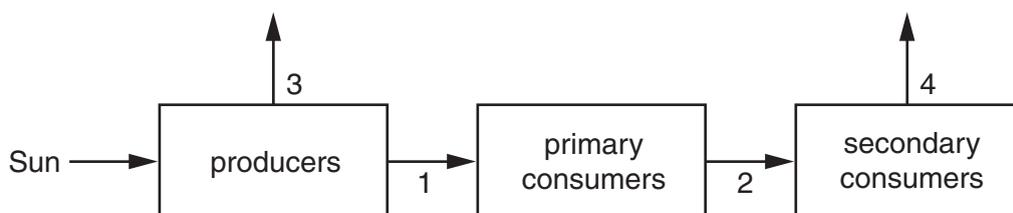
29 The diagram shows a pyramid of biomass for the food chain: grass → zebra → lion.



Which process causes loss of biomass from this food chain?

- A digestion
- B growth
- C photosynthesis
- D respiration

30 The diagram shows the flow of energy through an ecosystem.



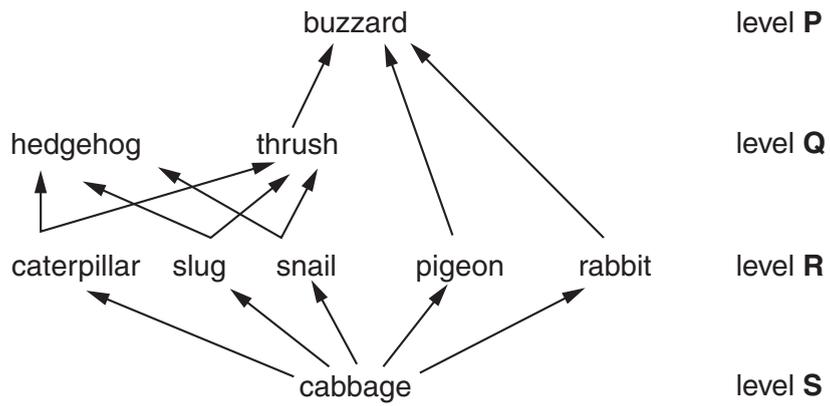
Which arrows represent the smallest amount of energy transferred between organisms, and the largest amount of energy lost to the ecosystem?

| | smallest energy transfer | largest energy loss |
|----------|--------------------------|---------------------|
| A | 1 | 3 |
| B | 1 | 4 |
| C | 2 | 3 |
| D | 2 | 4 |

31 What is true for the mosquito and the malarial parasite?

| | mosquito | malarial parasite |
|----------|----------|-------------------|
| A | host | vector |
| B | pathogen | host |
| C | pathogen | vector |
| D | vector | pathogen |

32 The diagram shows a food web.

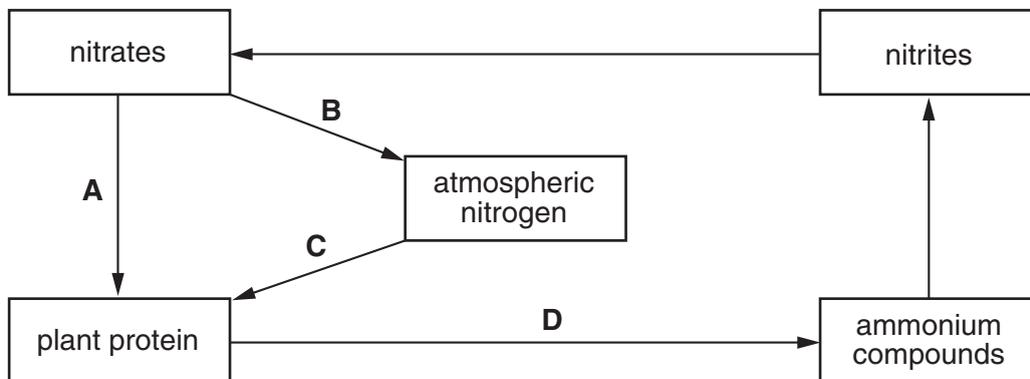


Which levels represent carnivores?

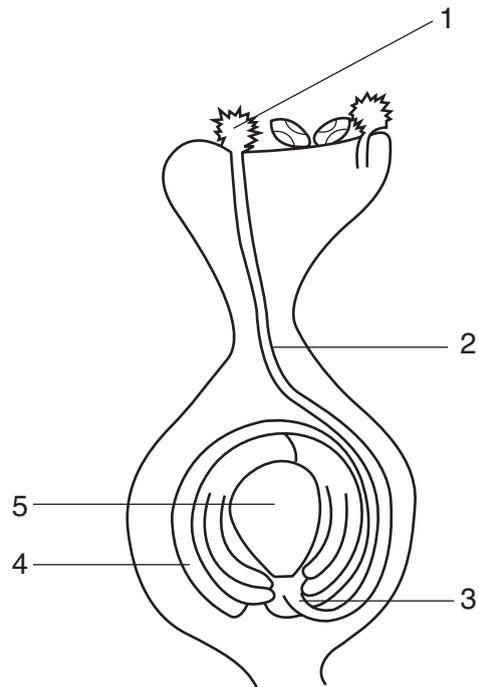
- A P and Q
- B P and R
- C Q and R
- D R and S

33 The diagram shows some stages in the nitrogen cycle.

Which arrow represents the action of decomposers?



34 The diagram shows a cross-section through the carpel of a flower just before fertilisation.

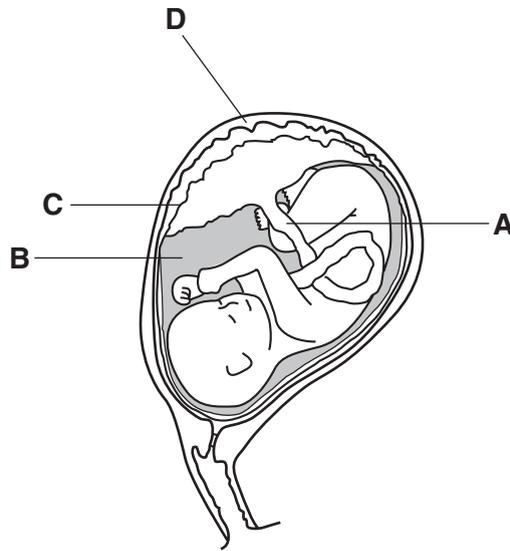


Where are the male and female gametes just before fertilisation?

| | male gamete | female gamete |
|----------|-------------|---------------|
| A | 1 | 5 |
| B | 1 | 4 |
| C | 2 | 4 |
| D | 3 | 5 |

35 The diagram shows a developing fetus.

Where does gaseous exchange between mother and fetus occur?



36 In which part of the female reproductive system does fertilisation occur?

- A ovary
- B oviduct
- C uterus
- D vagina

37 Which of the following are genetically identical?

- A brothers and sisters in the same family
- B cuttings taken from the same plant
- C gametes from the same parent
- D seeds produced by the same tree

38 Which blood group genotype is homozygous dominant?

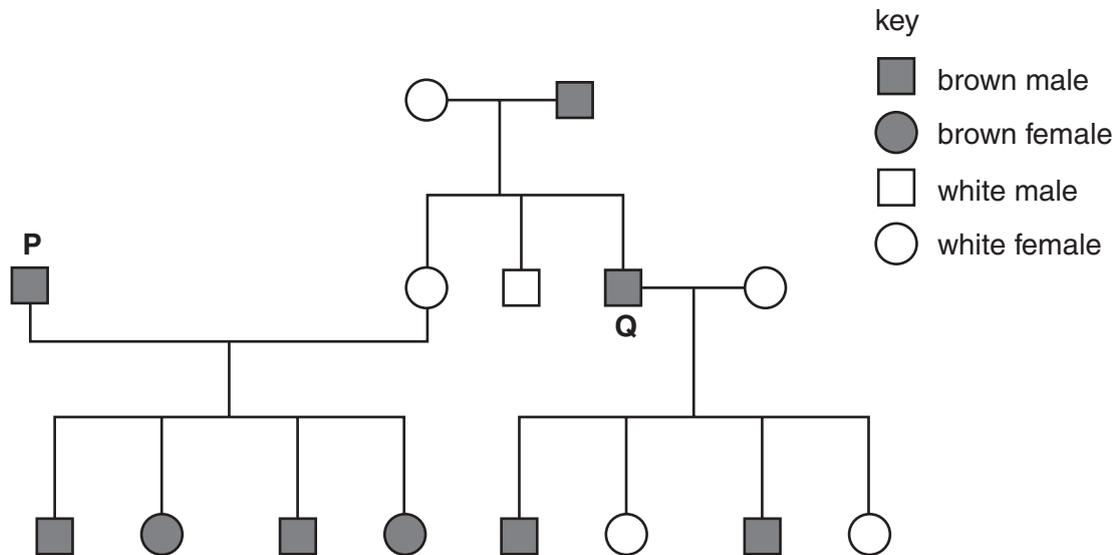
- A $I^A I^O$
- B $I^A I^B$
- C $I^B I^B$
- D $I^O I^O$

- 39 Two heterozygotes are crossed. Some of the offspring show the recessive characteristic.

What is the probability that the offspring that show the recessive characteristic are homozygous?

- A 0.00
 B 0.25
 C 0.5
 D 1.00

- 40 The chart shows the inheritance of coat colour in mice. The allele for brown coat, B, is dominant to the allele for white coat, b.



What are the most likely genotypes of the individuals P and Q?

| | P | Q |
|---|----|----|
| A | BB | BB |
| B | BB | Bb |
| C | Bb | BB |
| D | Bb | Bb |