

UNIVERSITY OF CAMBRIDGE INTERNATIONAL EXAMINATIONS
General Certificate of Education Ordinary Level

BIOLOGY

5090/01

Paper 1 Multiple Choice

October/November 2005

1 hour

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.

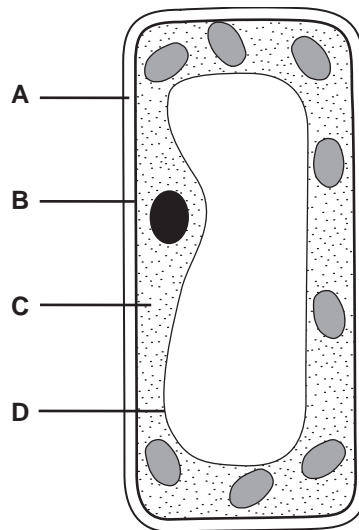
Any rough working should be done in this booklet.

This document consists of **19** printed pages and **1** blank page.

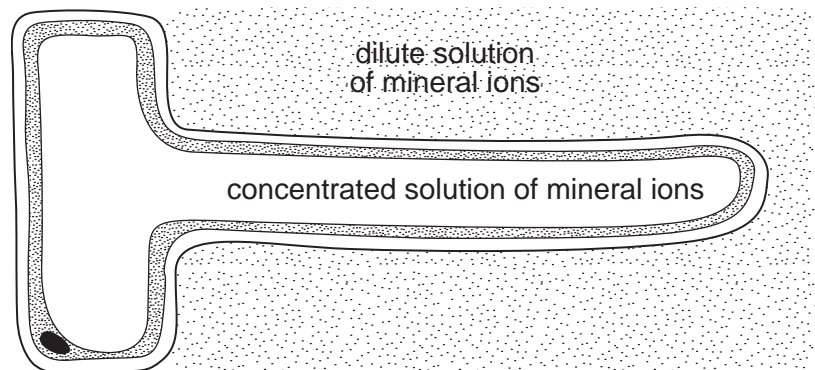


1 The diagram shows a plant cell.

Which labelled structure controls the passage of substances into and out of the cell?



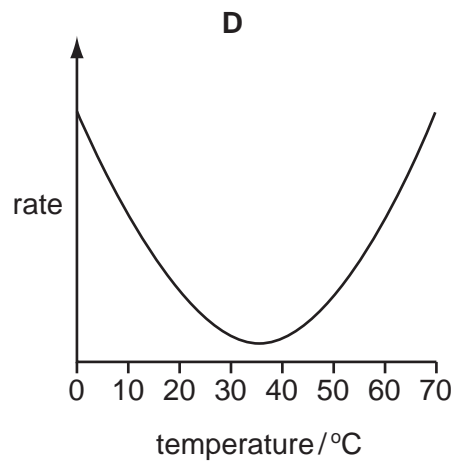
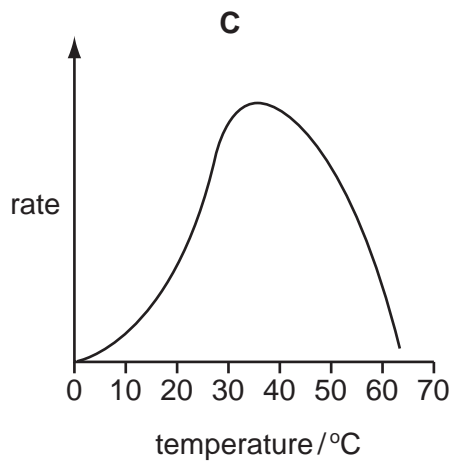
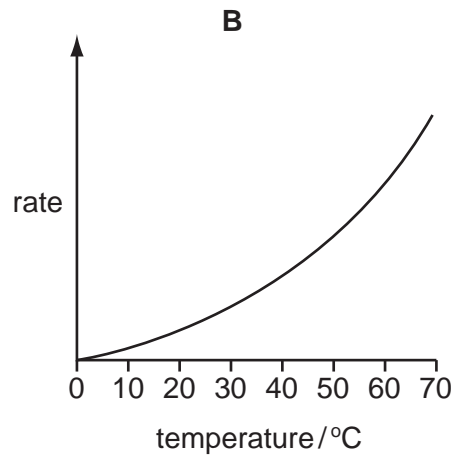
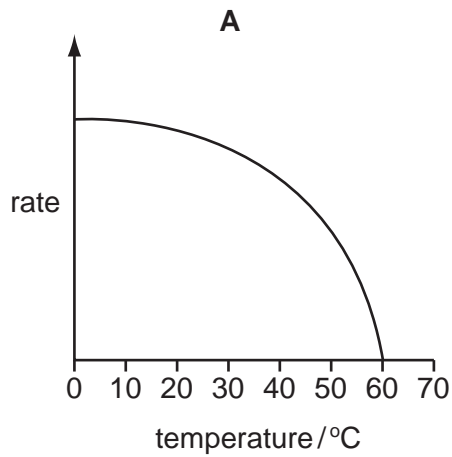
2 The diagram shows a root hair, surrounded by a dilute solution of mineral ions.



Which statement is correct?

- A Water molecules move into the root hair because their concentration is lower inside.
- B Water molecules move into the root hair because their concentration is lower outside.
- C Water molecules move out of the root hair because their concentration is lower inside.
- D Water molecules move out of the root hair because their concentration is lower outside.

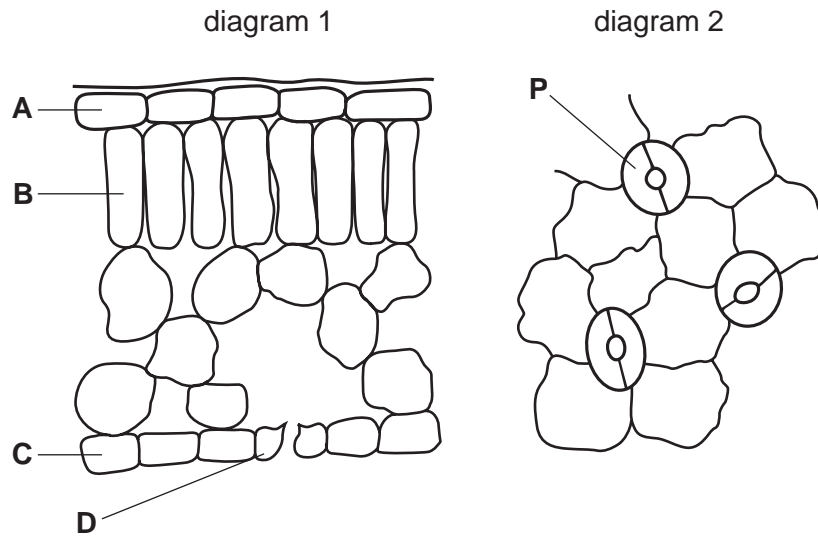
- 3 Which graph shows how an enzyme catalysed reaction in the alimentary canal varies with temperature?



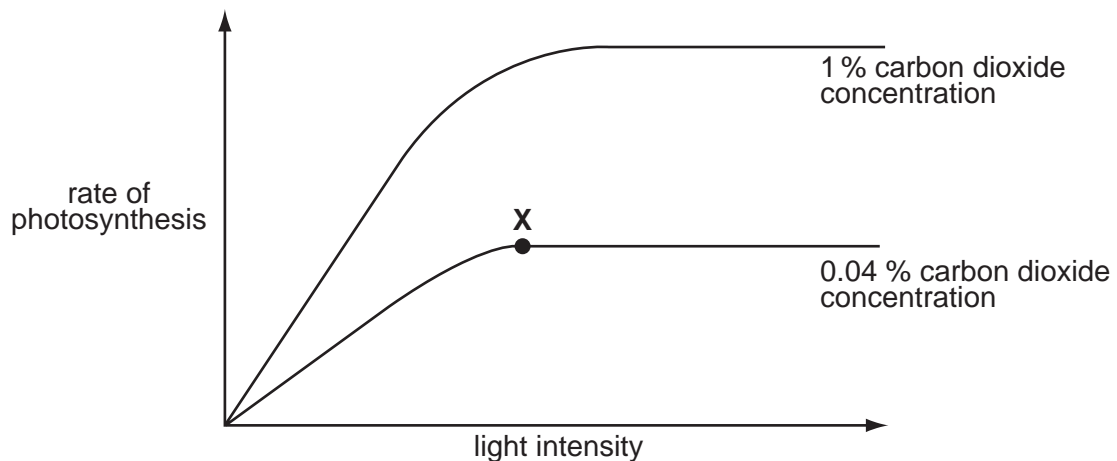
- 4 Which process can involve active transport?
- A** carbon dioxide intake through stomata
 - B** mineral ion intake through root hairs
 - C** mineral ion transport through xylem vessels
 - D** water leaving mesophyll cells

- 5 The diagrams show the outlines of cells in two different views of a leaf.

Which cell in diagram 1 is the same as cell **P** in diagram 2?



- 6 The graph shows how the rate of photosynthesis of a plant varies with light intensity at two different carbon dioxide concentrations. The temperature is kept constant at 20 °C.



Which factor is limiting the rate of photosynthesis at point **X**?

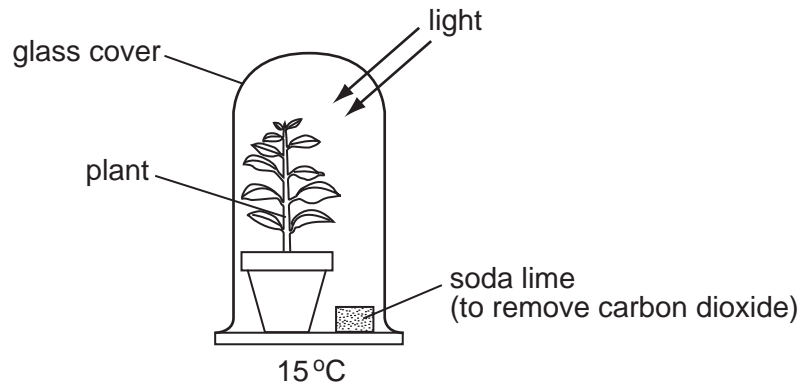
- A availability of chlorophyll
- B availability of water
- C concentration of carbon dioxide
- D intensity of light

- 7 Four different foods were tested as shown below and the test results were recorded as positive (+) or negative (-).

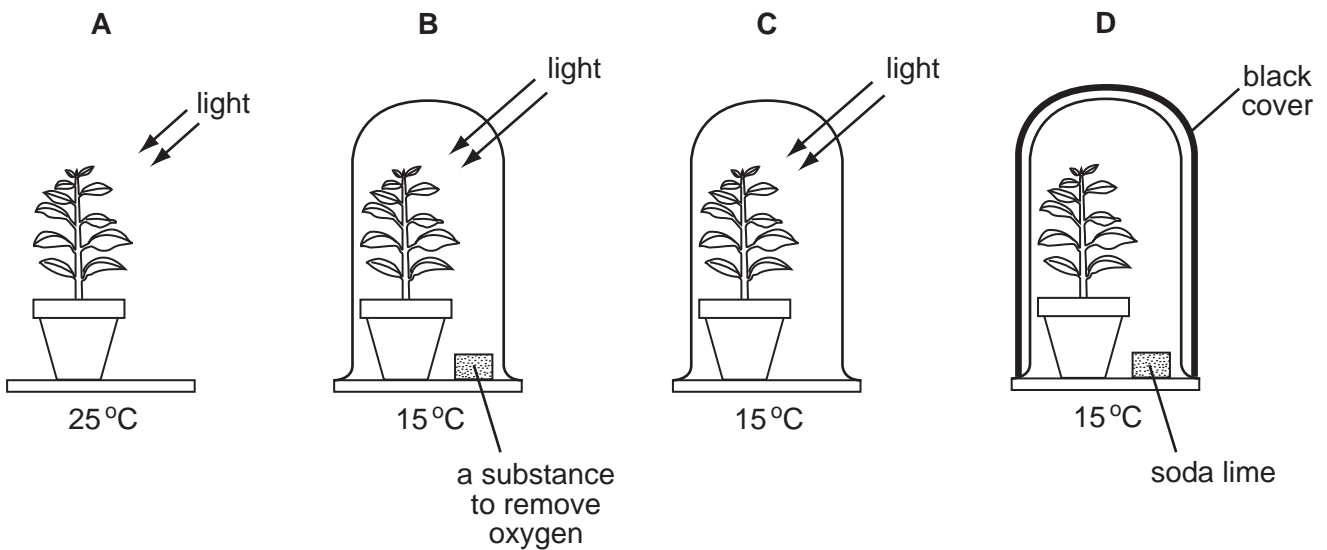
Which food contained both glucose and oil?

| food | Benedict's test | biuret test | ethanol emulsion test | iodine test |
|----------|-----------------|-------------|-----------------------|-------------|
| A | + | + | - | - |
| B | + | - | + | - |
| C | - | + | - | + |
| D | - | - | + | + |

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



What is the most suitable control for this experiment?



9 Which symptom is caused by a deficiency of vitamin D?

- A anaemia
- B bones breaking easily
- C constipation
- D gums bleeding

10 The diagram represents stages in the breakdown of starch to maltose by the enzyme amylase.



Which are the correct labels?

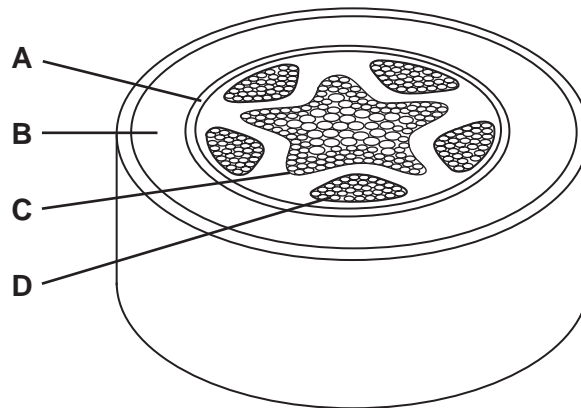
| | amylase | maltose | starch |
|---|---------|---------|--------|
| A | P | S | Q |
| B | Q | R | S |
| C | R | Q | P |
| D | S | P | R |

11 Which conditions cause the fastest rate of transpiration?

- A dry and cold
- B dry and warm
- C wet and cold
- D wet and warm

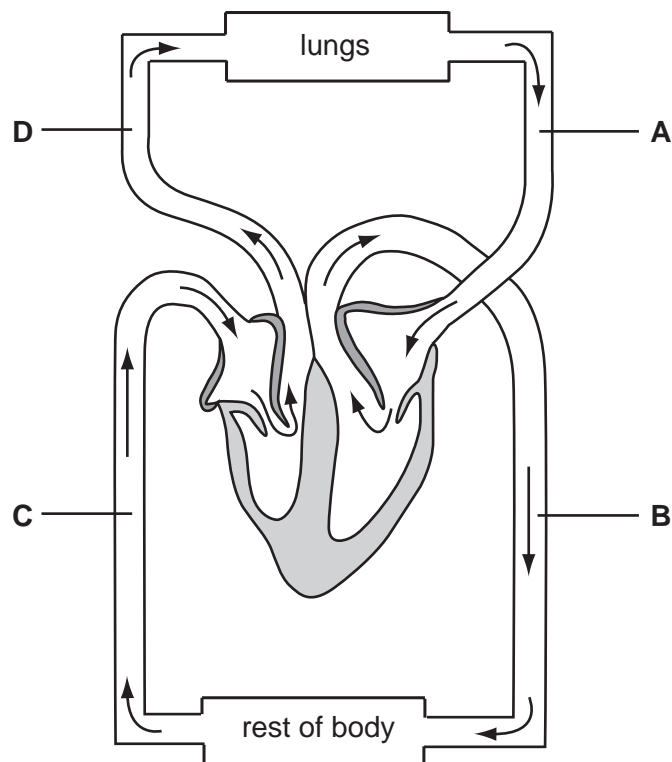
12 The diagram shows a cross-section of a root.

Which tissue transports water to the leaves?



13 The diagram shows part of the human circulatory system.

In which vessel is the blood pressure highest?



14 Which blood vessel carries blood with the **lowest** concentration of urea?

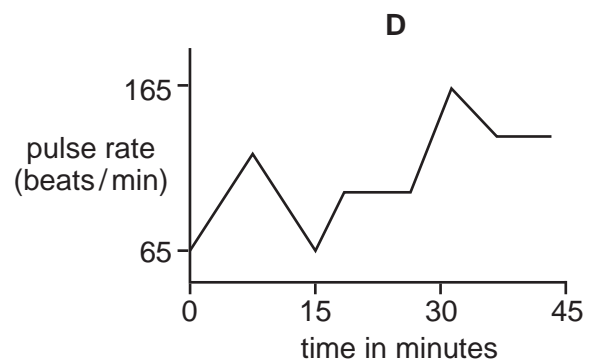
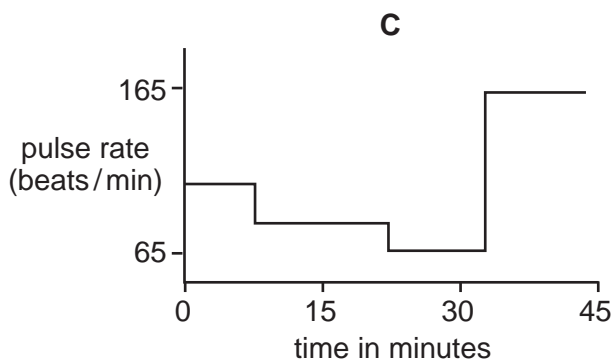
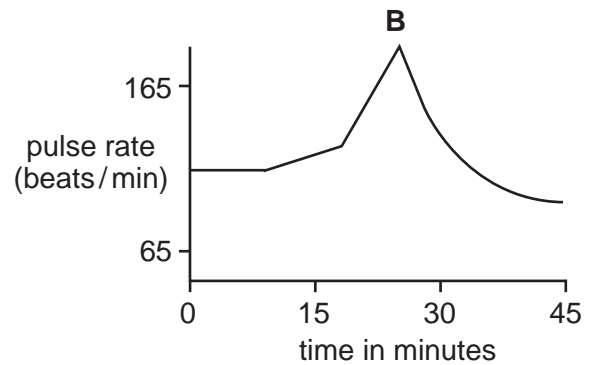
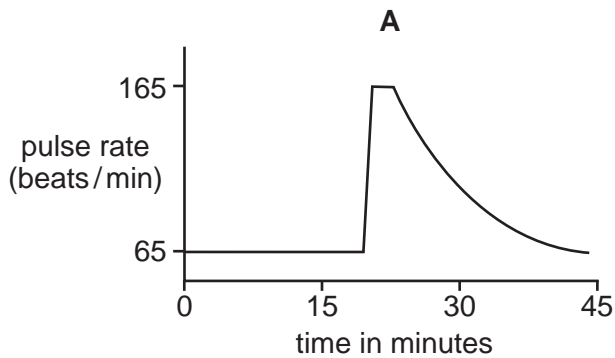
- A hepatic portal vein
- B pulmonary vein
- C renal vein
- D vena cava

15 The graph shows changes in a person's pulse rate over a period of 45 minutes.

The sequence of events involves:

- waiting in a queue
- entering a sports stadium
- seeing a goal scored
- relaxing during half time.

Which graph shows this sequence of events?



16 When the skin is cut the blood clots.

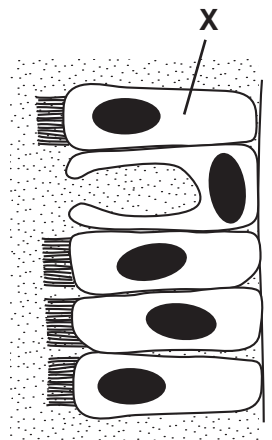
In which order would the components of the blood become involved?

| | first | → | | last |
|----------|------------|-----------------|-----------------|-----------------|
| A | fibrin | platelets | red blood cells | fibrinogen |
| B | fibrinogen | red blood cells | platelets | fibrin |
| C | platelets | fibrin | fibrinogen | red blood cells |
| D | platelets | fibrinogen | fibrin | red blood cells |

17 Which muscle actions occur during inspiration?

| | diaphragm muscles | external intercostal muscles |
|----------|-------------------|------------------------------|
| A | contract | contract |
| B | contract | relax |
| C | relax | contract |
| D | relax | relax |

18 The diagram shows part of the lining of the human trachea.



What is the function of cell X?

- A** gaseous exchange
- B** mucus removal
- C** phagocytosis
- D** secretion of mucus

19 The diagram shows a person holding out their arm.



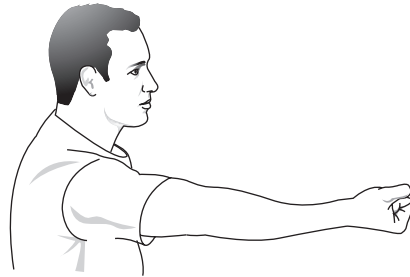
The ball and socket joint rotates and the hinge joint extends.

Which diagram shows the arm after these movements?

A



B



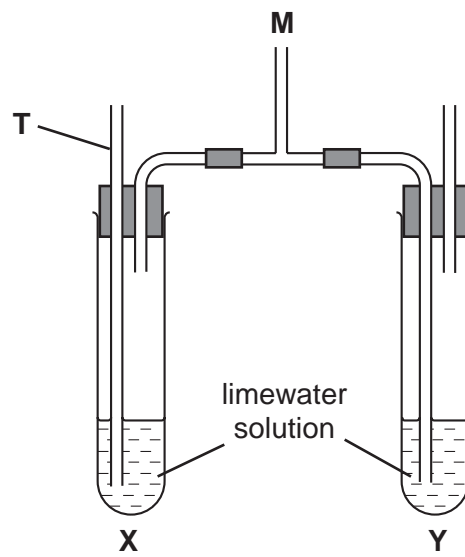
C



D



20 The apparatus shown is used to investigate gas exchange during breathing.

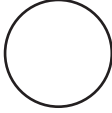


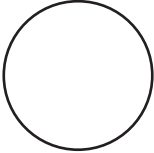
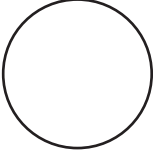

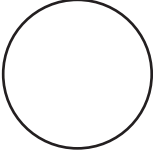
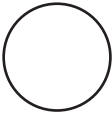


What would occur when a person breaths out through tube **M**?

- A** The solutions in **X** and **Y** both turn cloudy.
- B** The solution in **X** remains clear, but that in **Y** turns cloudy.
- C** The solution in **X** turns cloudy, but that in **Y** remains clear.
- D** The solution in **X** is forced out through the tube **T**.

- 21 The circles represent the diameter of the blood vessels in the surface of the skin as the body temperature changes.

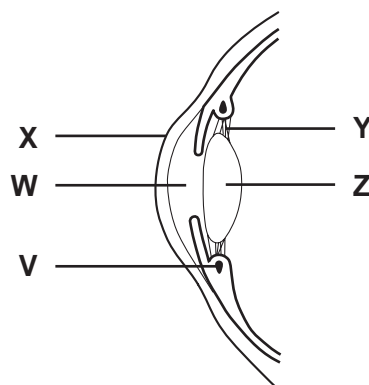
Which shows the diameter of the blood vessels after a decrease and after an increase in body temperature?

| | diameter of blood vessels | |
|----------|--|---|
| | after a decrease in body temperature | after an increase in body temperature |
| A |  |  |
| B |  |  |
| C |  |  |
| D |  |  |

- 22 What passes through the membranes of a kidney machine?

- A** protein and red blood cells
- B** urea and red blood cells
- C** water and protein
- D** water and urea

23 The diagram shows a section of a human eye focussed on a near object.



Which parts will change to focus on a distant object?

| | | | |
|----------|----------|----------|----------|
| A | W | X | Y |
| B | V | X | Z |
| C | W | Y | Z |
| D | V | Y | Z |

24 The table shows results from a study into the effects of smoking while pregnant.

| number of cigarettes smoked per day by mother while pregnant | average birth weight of baby/kg | average height of child at 15 years/cm |
|--|---------------------------------|--|
| 0 | 3.7 | 166.1 |
| 1–9 | 3.5 | 165.0 |
| 10 and over | 3.1 | 162.8 |

Which of these effects of smoking while pregnant is supported by the information in the table?

- A** increased growth rate
- B** increased length of pregnancy
- C** reduced birth weight
- D** reduced chance of respiratory disease

25 The table shows some structures found in four different cells.

Which cell is from a fungus?

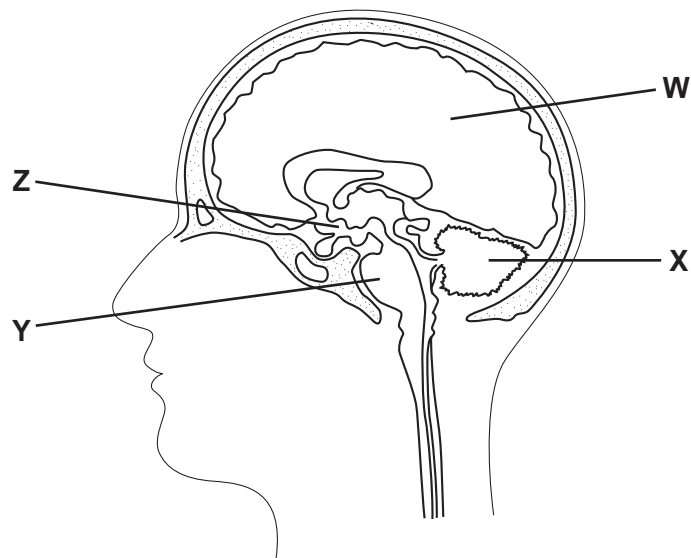
| cell | cell wall | cell membrane | nucleus membrane | chloroplasts |
|----------|-----------|---------------|------------------|--------------|
| A | ✓ | ✓ | ✓ | ✓ |
| B | x | ✓ | ✓ | ✓ |
| C | ✓ | ✓ | x | x |
| D | ✓ | ✓ | ✓ | x |

key

✓ = present

x = absent

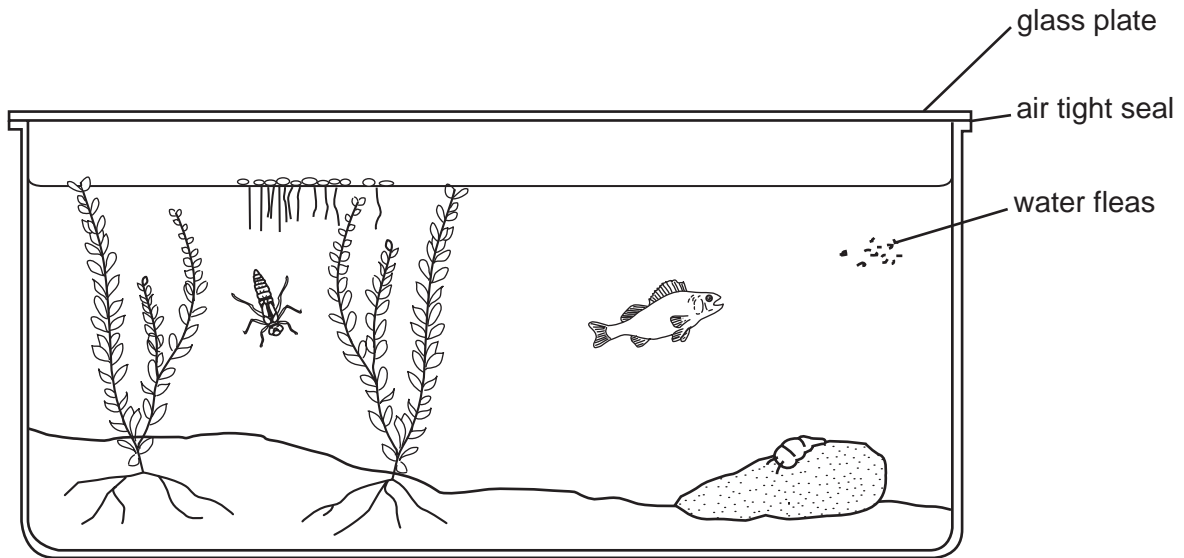
26 The diagram shows a section through the brain.



Which regions control balance, heart rate and temperature?

| | balance | heart rate | temperature |
|----------|----------|------------|-------------|
| A | W | Z | X |
| B | X | Y | Z |
| C | Y | X | W |
| D | Z | W | Y |

27 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?

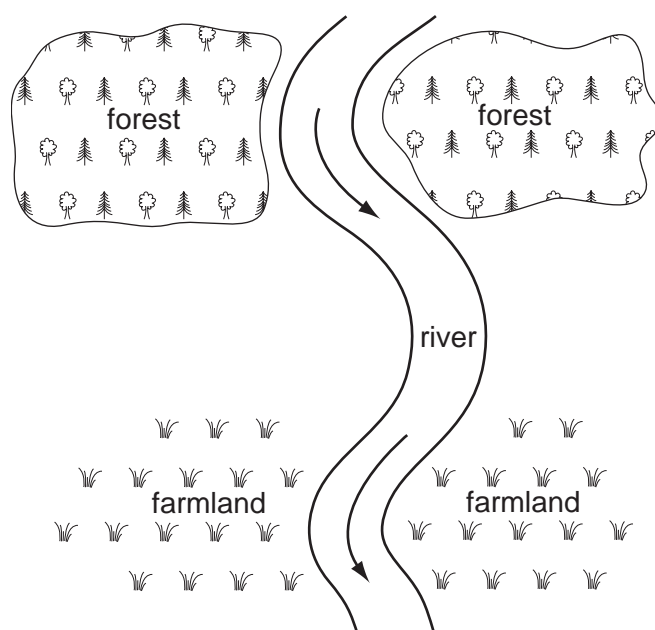
- A carbon dioxide
 - B light energy
 - C nitrates
 - D oxygen
- 28 What is a feature of bacteria?
- A They are always parasitic.
 - B They have a nucleus.
 - C They are made of hyphae.
 - D They reproduce by binary fission.
- 29 Which method of control would **not** be effective against the spread of the malarial parasite?
- A drainage of swamps and marshes
 - B safe disposal of sewage solids
 - C sleeping under a mosquito net
 - D spraying walls of houses with insecticide

- 30 Some types of bacteria make carbohydrates from carbon dioxide and water using the energy from sunlight.

What are these bacteria?

- A anaerobic
- B consumers
- C decomposers
- D producers

- 31 The diagram shows a forest and farmland either side of a river.

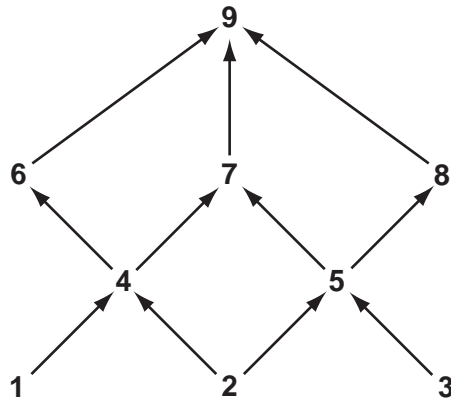


The forest is cut down.

What will be the most likely effect and how it is connected to the cutting down of the forest?

| | likely effect | how it is connected to the cutting down of the forest |
|----------|-------------------------------------|---|
| A | flooding of the farmland | water running off cleared area |
| B | gradual change to desert conditions | global warming |
| C | increase in number of water plants | more light falling on river |
| D | water logging of cleared area | trees no longer transpiring |

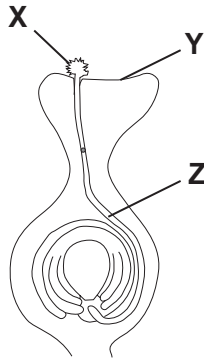
32 The diagram shows nine organisms forming a food web.



Which of the organisms is a producer and which is a carnivore?

| | producer | carnivore |
|----------|----------|-----------|
| A | 1 | 4 |
| B | 2 | 6 |
| C | 5 | 8 |
| D | 7 | 9 |

33 The diagram shows the carpel of a flower soon after pollination.



What are the labelled structures?

| | X | Y | Z |
|----------|--------------|----------|-------------|
| A | ovule | stigma | filament |
| B | ovule | stamen | pollen tube |
| C | pollen grain | stigma | pollen tube |
| D | pollen grain | stamen | filament |

34 The skin cells of an animal contain 8 chromosomes.

How many chromosomes will be present in each of the gametes produced by this animal?

- A 16 B 8 C 4 D 2

35 In pigs, the allele for black hair is dominant to the allele for red hair.

Two black-haired pigs mated and produced twelve offspring. Of the first eleven, eight had black hair and three had red hair.

What is the probability of the twelfth offspring having red hair?

- A 0.75 B 0.50 C 0.33 D 0.25

36 What is an advantage of feeding a baby with bottled milk rather than breast milk?

- A Breast milk contains antibodies.
 B It is easier to keep the milk free of pathogens.
 C The baby's intake of food can be measured.
 D The milk is always at the right temperature.

37 In human reproduction, which sequence of events is correct?

- A menstruation → ovulation → fertilisation → implantation
 B menstruation → ovulation → implantation → fertilisation
 C ovulation → menstruation → fertilisation → implantation
 D ovulation → menstruation → implantation → fertilisation

38 A woman has blood group O. Her child also has blood group O.

Which blood group can her husband **not** have?

- A A B B C AB D O

39 Sex in humans is determined by **X** and **Y** chromosomes inherited from parents.

Which shows the chromosome inherited from the father and from the mother?

| | sex of child | chromosome from father | chromosome from mother |
|----------|--------------|------------------------|------------------------|
| A | male | X | Y |
| B | male | Y | X |
| C | female | X | Y |
| D | female | Y | X |

40 Which two characteristics both show continuous variation?

- A** eye colour and height
- B** gender and eye colour
- C** height and weight
- D** weight and blood group

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