

CAMBRIDGE INTERNATIONAL EXAMINATIONS
General Certificate of Education Ordinary Level
BIOLOGY
PAPER 1 Multiple Choice

5090/1

MAY/JUNE SESSION 2002

1 hour

Additional materials:

- Multiple Choice answer sheet
- Soft clean eraser
- Soft pencil (type B or HB is recommended)

TIME 1 hour

INSTRUCTIONS TO CANDIDATES

Do not open this booklet until you are told to do so.

Write your name, Centre number and candidate number on the answer sheet in the spaces provided unless this has already been done for you.

There are **forty** questions in 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 very carefully the instructions on the answer sheet.

INFORMATION FOR CANDIDATES

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 question paper consists of 18 printed pages and 2 blank pages.



1 Which of the following have both cytoplasm and cell walls?

- A muscle cells
- B red blood cells
- C root hair cells
- D xylem vessels

2 Which of the following enters plant cells by active transport?

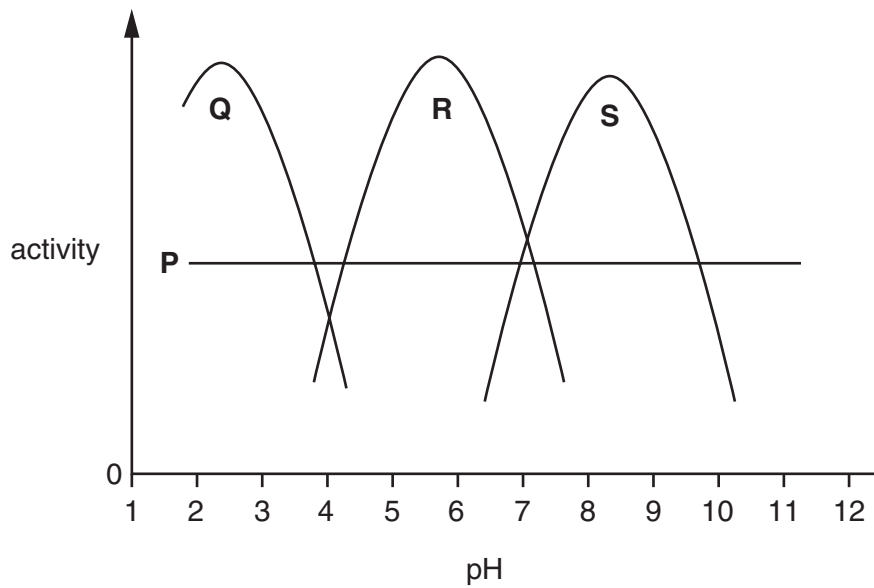
- A carbon dioxide
- B nitrate ions
- C oxygen
- D water

3 Four identical pieces of potato are treated in two stages, as shown.

Which piece of potato will be the largest after 2 hours?

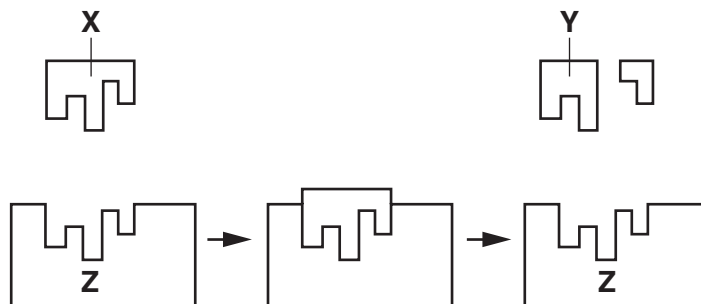
	stage 1	stage 2
A	boiled in water for 10 minutes	placed in 10% salt solution for 2 hours
B	boiled in water for 10 minutes	placed in distilled water for 2 hours
C	unboiled	placed in 10% salt solution for 2 hours
D	unboiled	placed in distilled water for 2 hours

- 4 The graph shows the effect of pH on the activity of four different enzymes.



Which pair of enzymes includes one from the stomach and one that is **not** affected by pH?

- A P and Q
 B P and S
 C R and Q
 D R and S
- 5 The diagram represents a model of enzyme action.



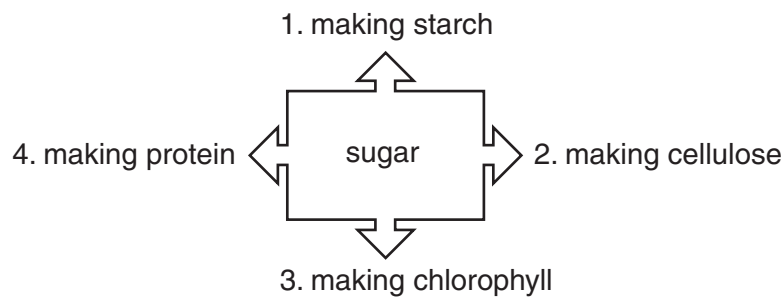
Which terms correctly identify X, Y and Z?

	X	Y	Z
A	enzyme	product	substrate
B	enzyme	substrate	product
C	substrate	enzyme	product
D	substrate	product	enzyme

6 Which identifies the function of each type of plant cell?

	palisade cells	phloem cells	root hair cells
A	photosynthesis	sugar transport	ion uptake
B	photosynthesis	sugar transport	transpiration
C	transpiration	photosynthesis	ion uptake
D	transpiration	photosynthesis	sugar transport

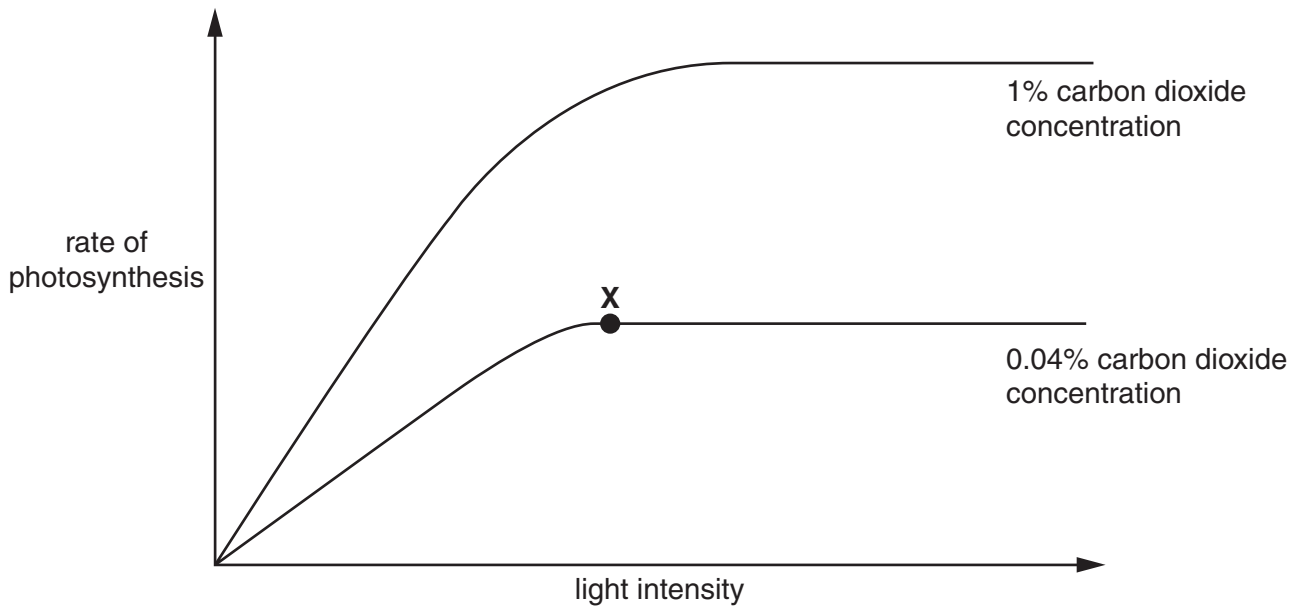
7 The diagram shows four different ways in which plants use the sugars produced by photosynthesis.



Which process requires magnesium ions and which requires nitrate ions?

	magnesium ions	nitrate ions
A	1	2
B	2	3
C	3	4
D	4	1

- 8 The graph shows how the rate of photosynthesis in 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 carbon dioxide concentration
 - B chlorophyll availability
 - C light intensity
 - D water availability
- 9 The table shows nutrients present in four foods.

food	carbohydrate	fat	protein
P	✓	x	✓
Q	x	x	✓
R	x	✓	x
S	✓	✓	x

key

✓ = present

x = absent

Which foods would both be partly digested in the stomach?

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

10 Which is **not** a function of the liver?

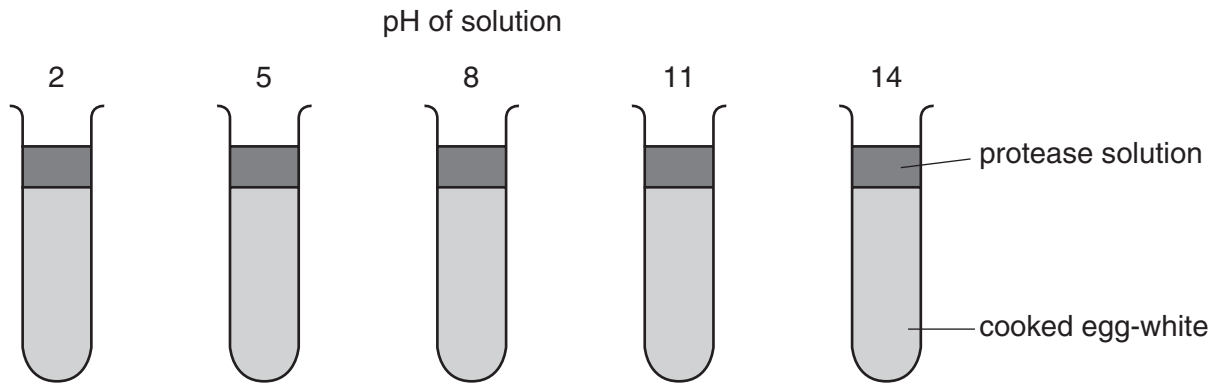
- A formation of glycogen
- B formation of urea
- C production of bile
- D secretion of digestive enzymes

11 10 cm^3 of a 1% starch suspension was incubated with 10 cm^3 of a 10% amylase solution for five minutes at $37\text{ }^\circ\text{C}$. Samples were then tested with iodine solution and with Benedict's solution.

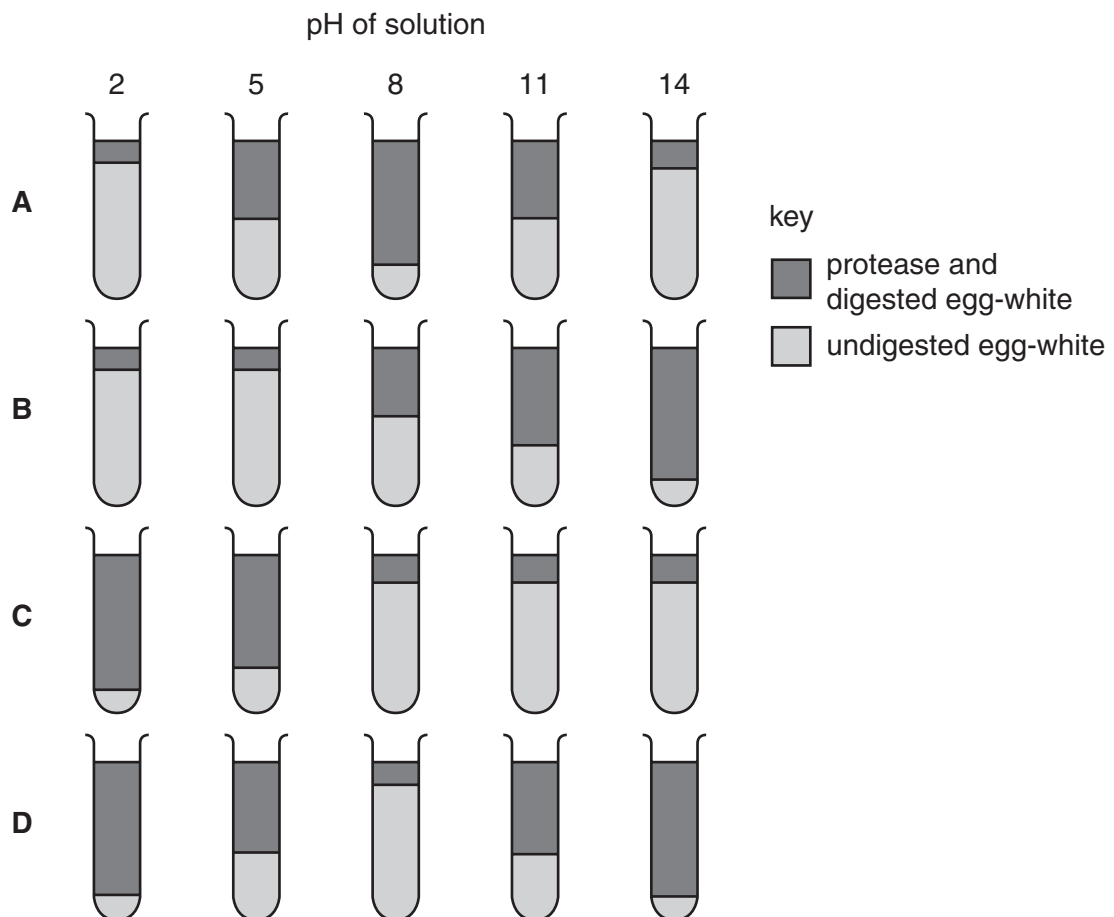
What are the expected results?

	colour with iodine solution	colour with Benedict's solution
A	black	blue
B	black	brick-red
C	brown	blue
D	brown	brick-red

- 12 Five tubes containing cooked egg-white are set up as shown. Protease solutions of different pH are added to each tube.



Which diagram shows the result of this experiment for a protease from the stomach?



13 Four regions of a green leaf are listed.

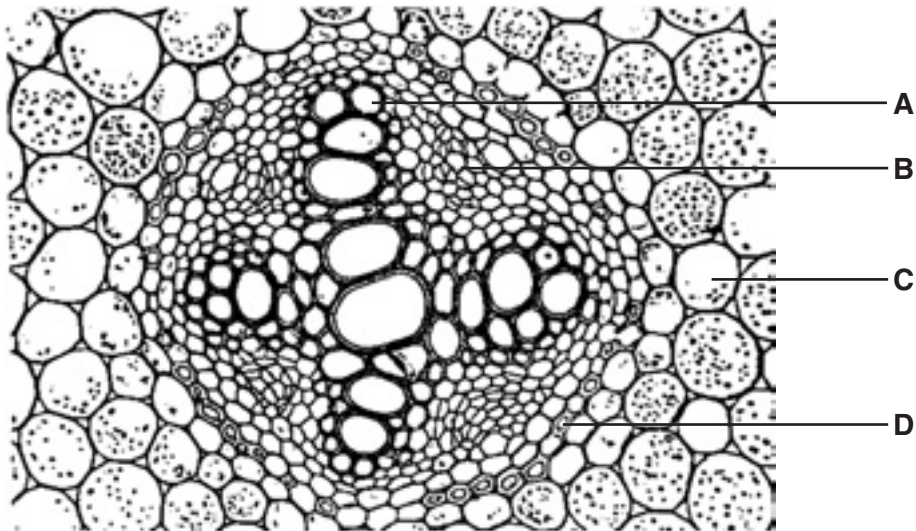
1. air space
2. spongy mesophyll cell
3. stoma
4. xylem vessel

In which order does a molecule of water, transported from the stem, pass through these regions into the air surrounding the leaf?

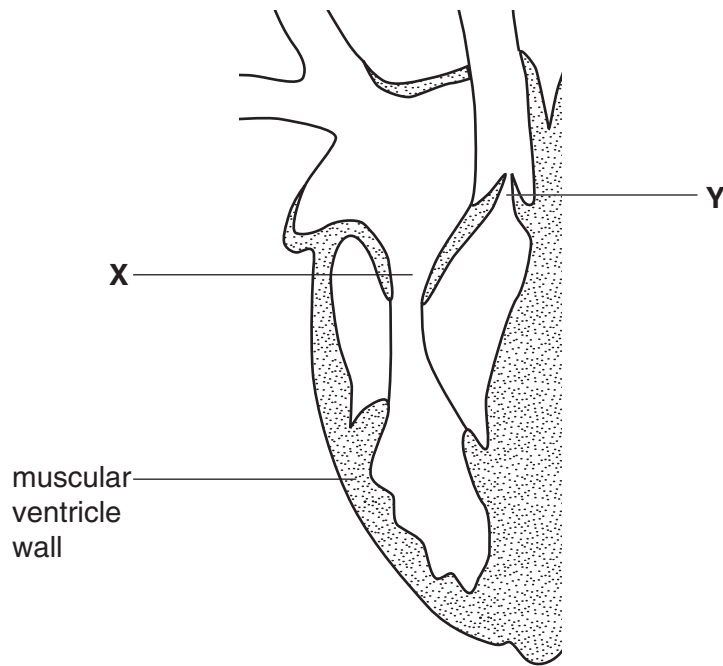
	first	—————▶	last
A	2	1	3 4
B	2	1	4 3
C	4	2	1 3
D	4	3	1 2

14 The diagram shows a transverse section from the middle of a root of a dicotyledonous plant.

In which tissue are sugars and amino acids transported?



15 The diagram shows the right-hand side of the human heart.



What is the state of the valves at **X** and **Y** when the muscular walls of the ventricle contract?

	valve at X	valve at Y
A	closed	closed
B	closed	open
C	open	closed
D	open	open

16 The diagram shows a valve in a section through a blood vessel.



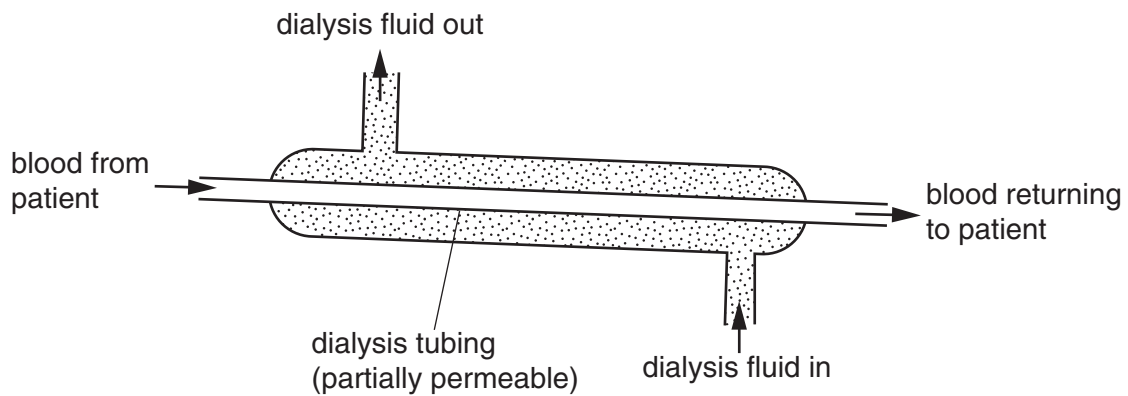
Which statement is correct?

- A** Blood flows from **X** to **Y**, opening the valve.
- B** Muscles in the wall contract and close the valve, preventing backflow.
- C** The elastic wall causes the valve to close between heartbeats.
- D** The valve is forced open when the blood pressure at **Y** is greater than at **X**.

- 17 What causes an oxygen debt to develop?
- A Breathing becomes very rapid.
 - B Carbon dioxide levels in the blood rise.
 - C Oxygen demand exceeds oxygen supply.
 - D The heartbeat increases.
- 18 Why does emphysema cause severe breathlessness?
- A The alveoli become coated with tar.
 - B The cilia lining the trachea are destroyed.
 - C The lungs become cancerous.
 - D The surface area of the lungs is reduced.
- 19 What happens during the process of breathing in?

	external intercostal muscles	diaphragm
A	contract	arches
B	contract	flattens
C	relax	arches
D	relax	flattens

20 The diagram represents the process of dialysis in a kidney machine.



Which substance would **not** be present in the dialysis fluid flowing in?

- A glucose
- B salt
- C urea
- D water

21 Four processes that take place in the human body are listed.

1. absorption of amino acids through the villi
2. maintenance of constant body temperature
3. production of lactic acid in muscles
4. regulation of blood glucose concentration

Which two processes are directly controlled by negative feedback?

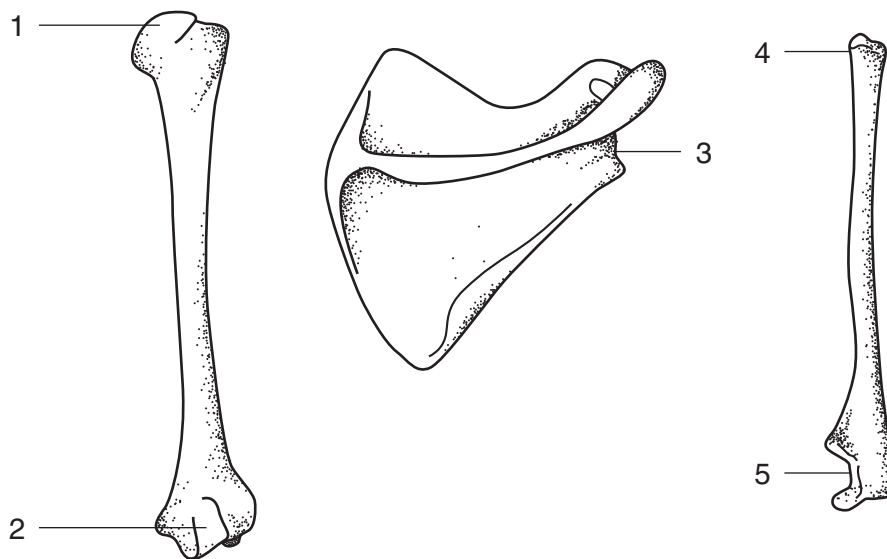
- A 1 and 3
- B 1 and 4
- C 2 and 3
- D 2 and 4

- 22 The table shows the time taken for a driver to stop the car in an emergency before and after drinking alcohol.

	time taken to decide to stop / sec	time taken to stop / sec
before drinking alcohol	1.5	2.2
after drinking alcohol	2.1	3.6

The results show the effect of alcohol on the

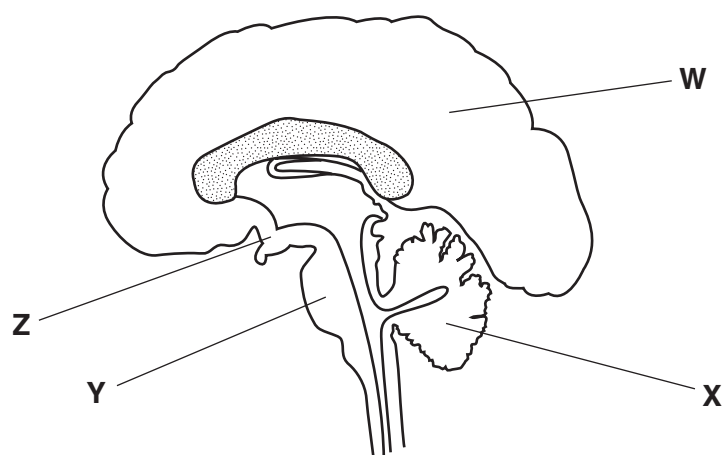
- A blood sugar level.
 B brain.
 C eye.
 D heart rate.
- 23 The diagram shows three bones from the forelimb of a mammal.



Between which parts is a ball and socket joint formed?

- A 1 and 3 B 1 and 5 C 2 and 5 D 3 and 4

24 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

25 Three directions in which nerve impulses can travel in the nervous system are listed.

1. away from the central nervous system
2. towards the central nervous system
3. within the central nervous system

In which direction do impulses in sensory and relay (intermediate) neurones travel?

	sensory neurone	relay neurone
A	1	2
B	1	3
C	2	1
D	2	3

- 26 When yeast is used in bread-making, which type of respiration occurs, which product is useful and which product is waste?

	respiration	useful product	waste product
A	aerobic	carbon dioxide	ethanol
B	aerobic	ethanol	carbon dioxide
C	anaerobic	carbon dioxide	ethanol
D	anaerobic	ethanol	carbon dioxide

- 27 In an ecosystem, which are recycled?

	carbon	energy	nitrogen
A	✓	✓	✓
B	✓	✓	✗
C	✓	✗	✓
D	✗	✓	✓

key

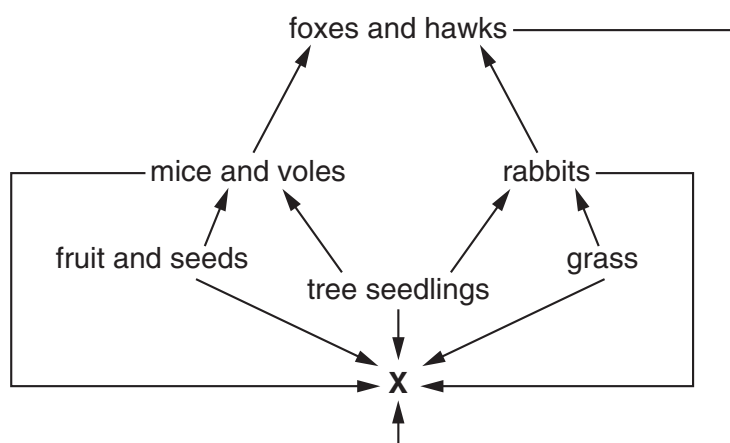
✓ = recycled

✗ = not recycled

- 28 What is the original source of the energy that flows through a food chain?

- A** carbon dioxide
- B** glucose
- C** oxygen
- D** sunlight

29 The diagram shows a food web.



Which type of organism is X?

- A carnivore
- B decomposer
- C herbivore
- D producer

30 Which of the following describes the flow of energy in an ecosystem?

- A heat energy → chemical energy → light energy
- B heat energy → light energy → chemical energy
- C light energy → chemical energy → heat energy
- D light energy → heat energy → chemical energy

31 Draining stagnant water is one method of controlling the malarial mosquito.

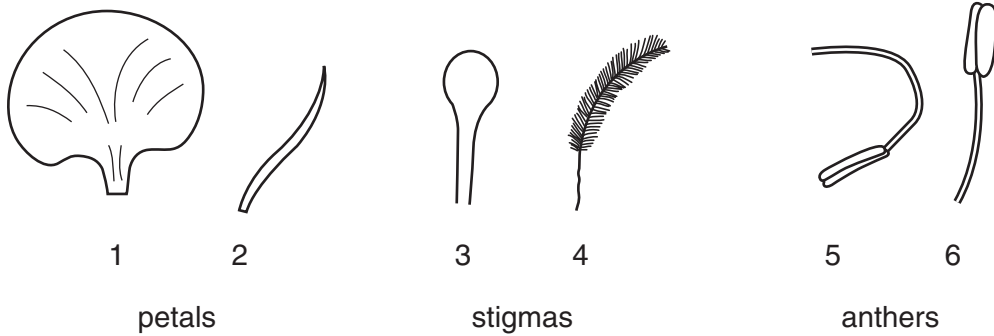
Which stages in the mosquito life cycle does this method destroy?

- A egg, larva, adult
- B egg, larva, pupa
- C egg, pupa, adult
- D larva, pupa, adult

32 What causes the **decrease** in oxygen concentration in a lake polluted by sewage?

- A a decrease in the dissolved nitrate concentration
- B a decrease in the number of consumers
- C an increase in the number of decomposers
- D an increase in the number of green plants

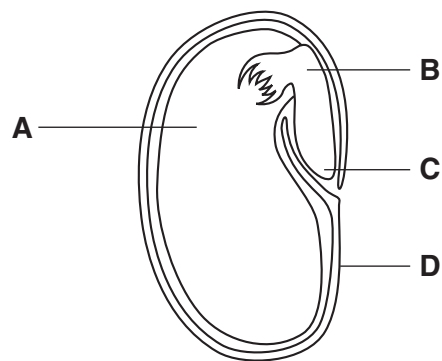
33 Which diagrams show parts of an insect-pollinated flower?



A	1	3	6
B	1	4	5
C	2	3	5
D	2	4	6

34 The diagram shows a section of a non-endospermic seed.

Which structure would show the greatest loss of dry mass during the first week of germination?

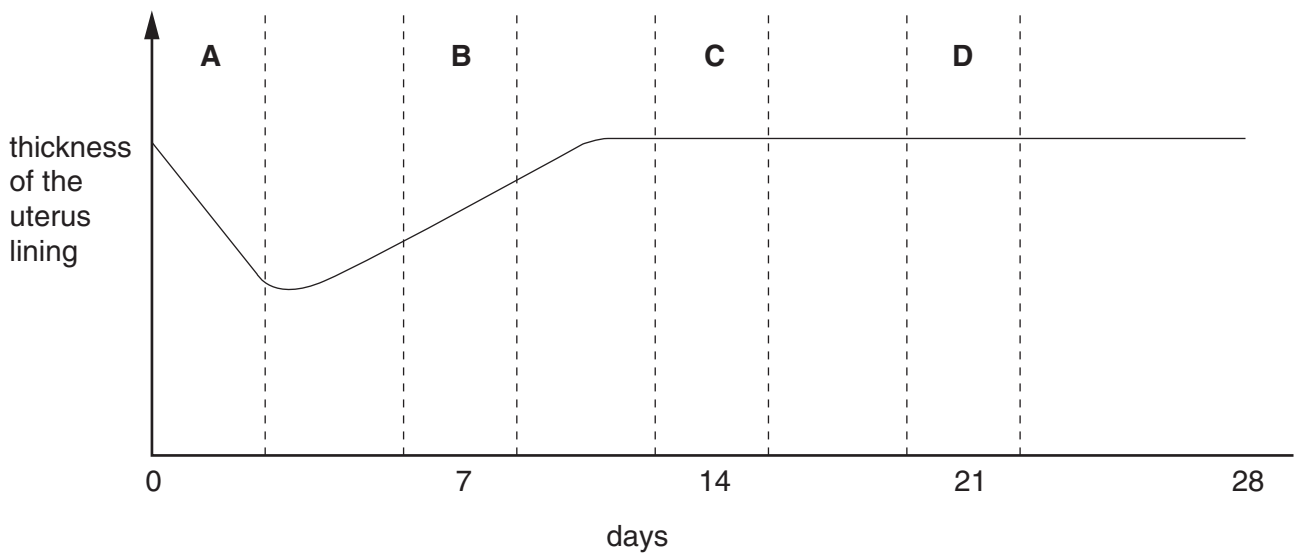


35 Which structure contains the fetus that develops from a human zygote?

- A ovary
- B ureter
- C urethra
- D uterus

36 The diagram shows the thickness of the lining of the uterus during the menstrual cycle.

During which part of the cycle is the woman most fertile?



37 A farmer saves the best seeds from his maize crop to sow for next year's crop.

This is an example of

- A artificial selection.
- B genetic engineering.
- C natural selection.
- D variation.

38 Which describes the chromosomes in a human egg before fertilisation?

- A 22 chromosomes + one X chromosome
- B 22 chromosomes + two X chromosomes
- C 22 pairs of chromosomes + one X chromosome
- D 22 pairs of chromosomes + two X chromosomes

39 Dillip and Shabnam made four statements about themselves.

	Dillip	Shabnam
1	I am a boy.	I am a girl.
2	I am 150 cm tall.	I am 153 cm tall.
3	I am not very good at games.	I am good at games.
4	My blood group is A.	My blood group is AB.

Which statements describe characteristics that show discontinuous variation?

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

40 Two parents both have the same genotype, $I^A I^O$, for blood group.

What are the expected probabilities of the blood groups of their children?

	group A	group O
A	1.00	0.00
B	0.75	0.25
C	0.50	0.50
D	0.25	0.75

