

**CAMBRIDGE INTERNATIONAL EXAMINATIONS**  
**General Certificate of Education Ordinary Level**

**SCIENCE (PHYSICS,BIOLOGY)**

**5125/1**

PAPER 1 Multiple Choice

**OCTOBER/NOVEMBER 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 to be 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.

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**This question paper consists of ? printed pages and ? blank pages.**

**All questions are taken from 5153/1 November 2002**

1 A stone is falling through the air. The acceleration of free fall is  $10 \text{ m/s}^2$ .

Ignoring air resistance, what happens to the stone every second during its fall?

- A The acceleration of the stone increases by  $10 \text{ m/s}^2$ .
- B The speed of the stone increases by  $10 \text{ m/s}$ .
- C The stone travels a distance of  $10 \text{ m}$ .
- D The stone travels at a speed of  $10 \text{ m/s}$ .

2 A cube of side length  $3 \text{ cm}$  is placed in a measuring cylinder. On adding  $125 \text{ cm}^3$  of water, the cube remains at the bottom of the cylinder.

What is the reading on the measuring cylinder?

- A  $128 \text{ cm}^3$
- B  $131 \text{ cm}^3$
- C  $134 \text{ cm}^3$
- D  $152 \text{ cm}^3$

3 Which of the following describes the density of a material?

- A the amount of matter in the material
- B the mass per unit volume of the material
- C the pull of gravity on the material
- D the volume per unit mass of the material

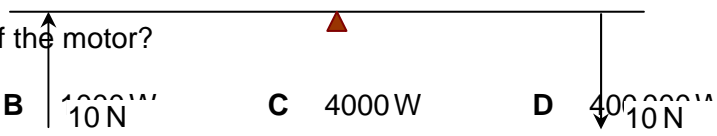
4 Forces are applied to a beam pivoted at its centre.

Which example demonstrates the Principle of Moments?

5 An electric motor can lift a weight  $0.4 \text{ m}$  through  $0.4 \text{ m}$  of  $10 \text{ N}$  in  $20 \text{ s}$ .

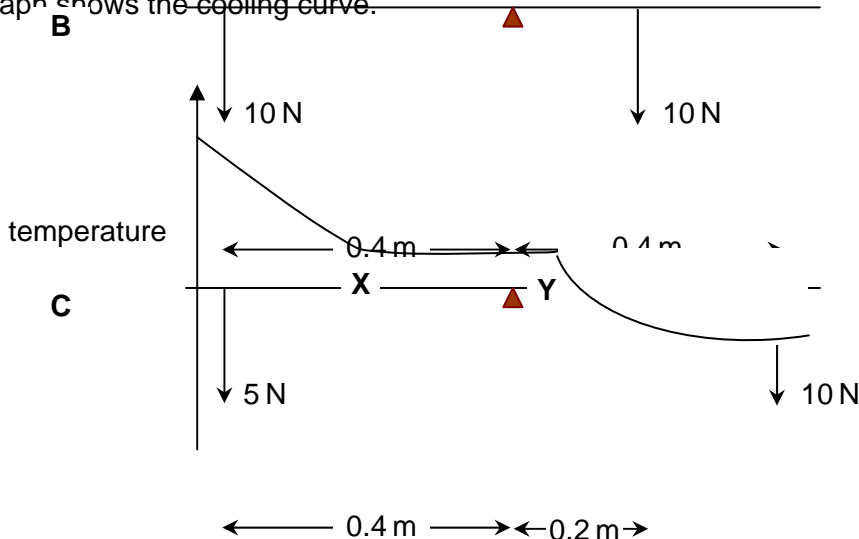
What is the power of the motor?

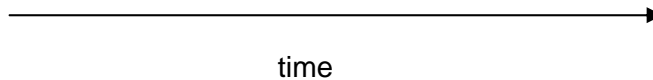
- A  $10 \text{ W}$
- B  $1000 \text{ W}$
- C  $4000 \text{ W}$
- D  $40000 \text{ W}$



6 A waxy solid is melted in a boiling tube and then allowed to cool at room temperature.

The graph shows the cooling curve.





What is happening between points **X** and **Y**?

- A** liquid is cooling
- B** liquid is turning to solid
- C** solid is cooling
- D** solid has stopped cooling

**7** In solids, thermal energy is transferred by conduction.

What is the cause of conduction?

- A** change in density
- B** expansion
- C** infra-red radiation
- D** molecular vibrations

**8** A VHF radio station broadcasts at a frequency of 60 MHz ( $6.0 \times 10^7$  Hz). The speed of radio waves is  $3.0 \times 10^8$  m/s.

What is the wavelength of the waves broadcast by the station?

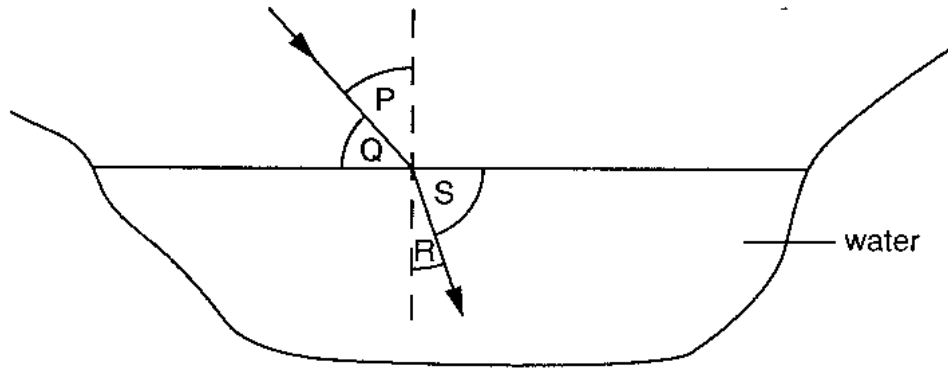
- A** 5.0 m            **B** 2.0 m            **C** 0.5 m            **D** 0.2 m

**9** Which of the following correctly describes the image formed by a thin converging lens when used as a magnifying glass?

- A** real            erect            magnified
- B** real            inverted        magnified
- C** virtual        erect            magnified
- D** virtual        inverted        magnified

**10** The diagram shows the path of a ray of light travelling towards and into a pool of water.

Four angles are labelled.



Which two angles would be correctly used in the equation  $\frac{\sin i}{\sin r} = \text{constant}$ ?

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

11 A guitar string is made to vibrate.

What would make the pitch of the note rise?

- A a decrease in the amplitude of vibration
- B an increase in the amplitude of vibration
- C a decrease in the frequency of vibration
- D an increase in the frequency of vibration

12 A bar magnet is placed between two iron bars.

Which diagram correctly shows the poles induced in both iron bars?

iron bar 1

bar magnet

iron bar 2

A



13 Which of the following describes the e.m.f. of a cell?

AB

the energy that is converted to electrical energy by the cell and through the cell

BC

the energy used to drive charge through the resistance of the cell

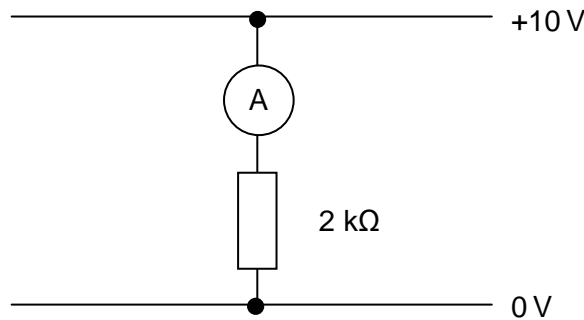
C

the energy used to drive charge through the resistance of the cell

DD

the energy that is converted to electrical energy by the cell and through the cell

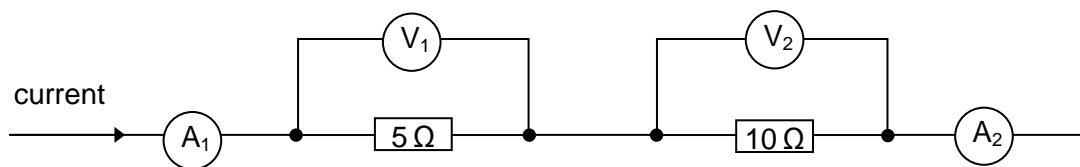
14 An ammeter is connected in the simple circuit as shown.



Which current flows through the ammeter?

- A** 5 mA      **B** 20 mA      **C** 0.2 A      **D** 5 A

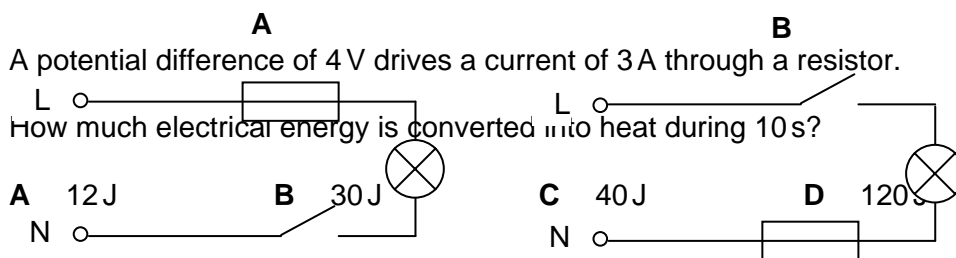
15 A current flows in two resistors connected in series as shown.  $A_1$  and  $A_2$  are the readings on the ammeters.  $V_1$  and  $V_2$  are the readings on the voltmeters.



Which of the following correctly describes the ammeter and the voltmeter readings?

- |          | <i>ammeter readings</i>     | <i>voltmeter readings</i> |
|----------|-----------------------------|---------------------------|
| <b>A</b> | $A_1$ is equal to $A_2$     | $V_1$ is equal to $V_2$   |
| <b>B</b> | $A_1$ is equal to $A_2$     | $V_1$ is less than $V_2$  |
| <b>C</b> | $A_1$ is greater than $A_2$ | $V_1$ is equal to $V_2$   |
| <b>D</b> | $A_1$ is greater than $A_2$ | $V_1$ is less than $V_2$  |

16 Which circuit shows the correct positions for the fuse and switch in the lighting circuit of a house?

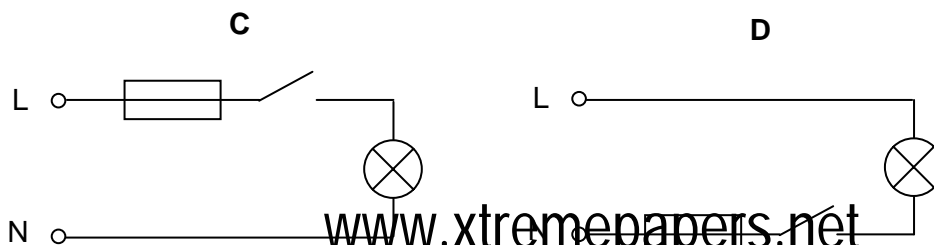


17 A potential difference of 4 V drives a current of 3 A through a resistor.

How much electrical energy is converted into heat during 10 s?

- A** 12 J      **B** 30 J      **C** 40 J      **D** 120 J

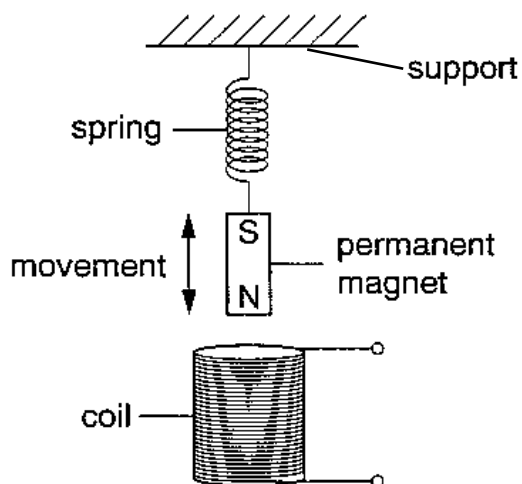
18 A permanent magnet moving up and down on the end of a spring induces an e



key

L = live wire

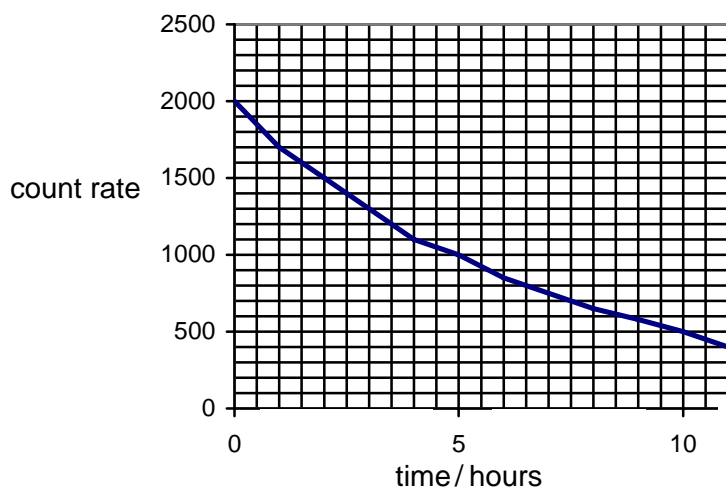
N = neutral wire



Which factor, on its own, would **decrease** the maximum value of the induced e.m.f.?

- A increasing the number of turns in the coil
- B increasing the strength of the magnet
- C raising the coil
- D raising the support of the spring

19 The graph shows the count rate for a radioactive source over a few hours.



What will be the count rate after 20 hours?

- A 0
- B 62.5 units
- C 125 units
- D 250 units

20 What is the nucleon number (mass number) of a nuclide?

- A the number of neutrons

- B the number of protons
- C the number of neutrons and protons
- D the number of protons and electrons

21 A new cell is being examined.

Which feature would enable you to identify it as a plant cell or an animal cell?

- A The cell contains a single large sap vacuole space.
- B The cell contains glucose and amino acids.
- C The cell contains stored fat.
- D The cell surface membrane is partially permeable.

22 Which of these processes require energy from respiration?

	diffusion	osmosis
<b>A</b>	✓	✓
<b>B</b>	✓	7
<b>C</b>	7	✓
<b>D</b>	7	7

key

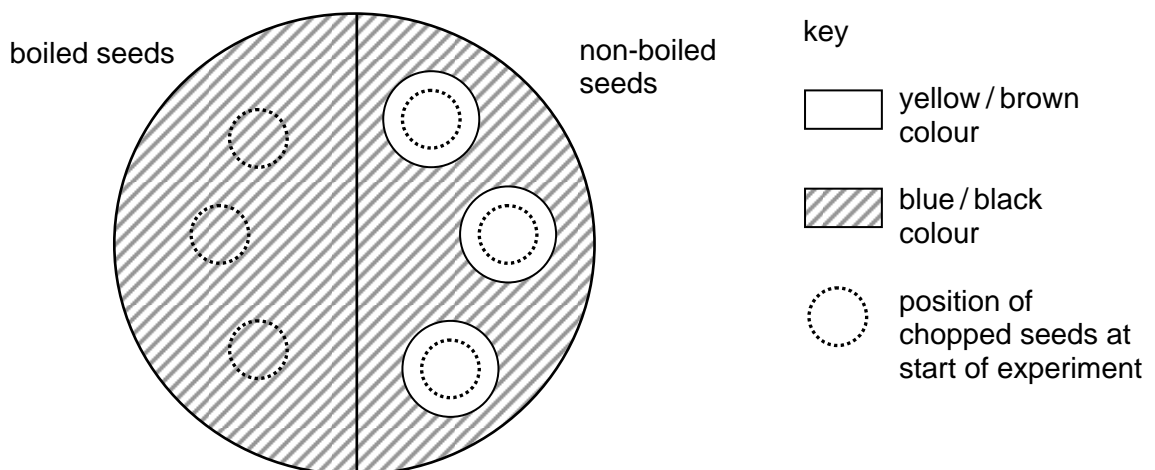
✓ energy required

7energy not required

23 Six bean seeds were soaked in water for 24 hours. Three of them were then boiled and cooled. The boiled and the non-boiled seeds were chopped up and then placed on the surface of agar jelly containing starch.

After two days, all the seeds were removed and the jelly was flooded with iodine solution.

The diagram shows the result of the experiment.





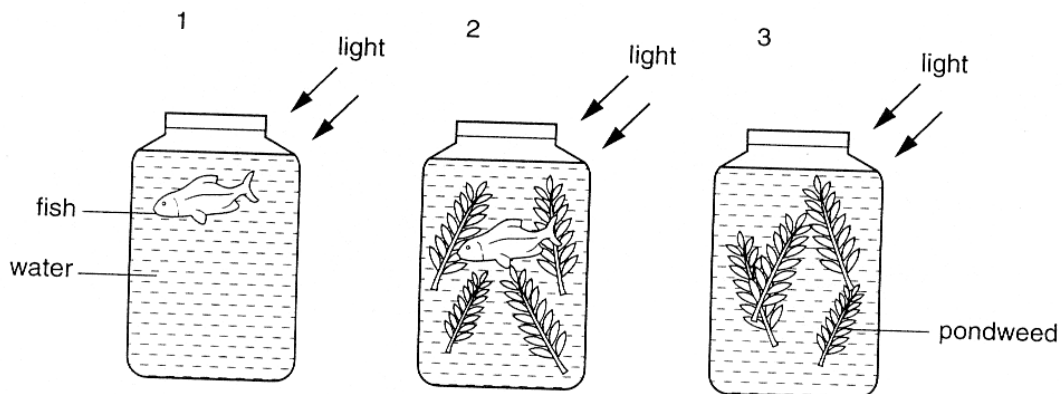
What is the explanation for the results with the non-boiled bean seeds?

- A They absorb iodine.
- B They absorb starch.
- C They secrete acid.
- D They secrete amylase.

24 What is the function of chlorophyll in plants?

- A to absorb carbon dioxide
- B to absorb light
- C to absorb nitrate
- D to absorb water

25 Three sealed jars were set up as shown.



How will the concentration of dissolved carbon dioxide in the water of each jar change?

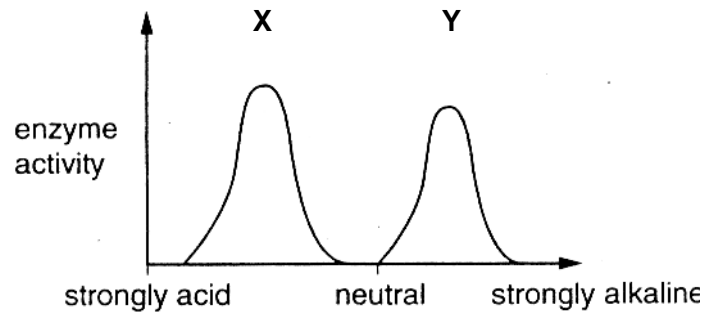
	jar 1	jar 2	jar 3
<b>A</b>	decreases	increases	no change
<b>B</b>	increases	increases	increases
<b>C</b>	increases	no change	decreases
<b>D</b>	no change	decreases	decreases

26 Why is it important to include fibre in the diet?

- A It gives energy to keep the body warm.
- B It helps food pass through the gut.
- C It increases growth in young children.

**D** It is easy to digest.

**27** The diagram shows the effect of pH on the activity of two enzymes, **X** and **Y**, in the alimentary canal.

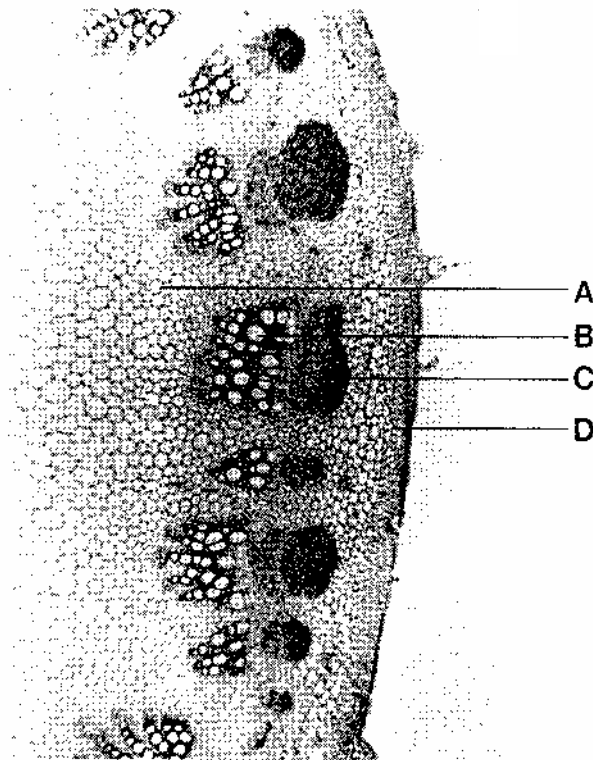


In which regions of the alimentary canal would these enzymes be most active?

	<b>X</b>	<b>Y</b>
<b>A</b>	duodenum	colon
<b>B</b>	duodenum	stomach
<b>C</b>	stomach	colon
<b>D</b>	stomach	duodenum

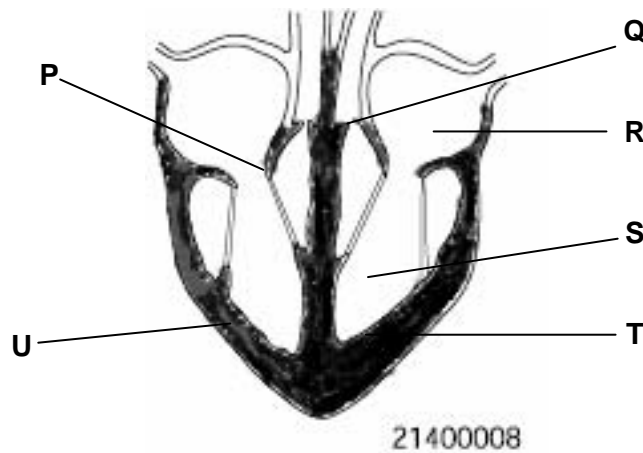
**28** The photograph shows a cross-section of part of a sunflower stem under the microscope.

Which tissue transports water and mineral salts?



Artist, this photograph was used in 5090/1 O Level Biology Summer 1996

29 The diagram shows a section through the human heart.



Artist: lighter and uniform shading

What feature suggests that the blood leaves the heart at different pressures, going to the lungs and to the body?

- A chambers R and S have different volumes
- B the walls of the atria are thinner than the walls of the ventricles
- C valve P is stronger than valve Q
- D wall T is more muscular than wall U

30 Which substance builds up in a muscle as a result of anaerobic respiration?

- A carbon dioxide
- B ethanol
- C lactic acid
- D water

31 A person is sitting in a dark room.

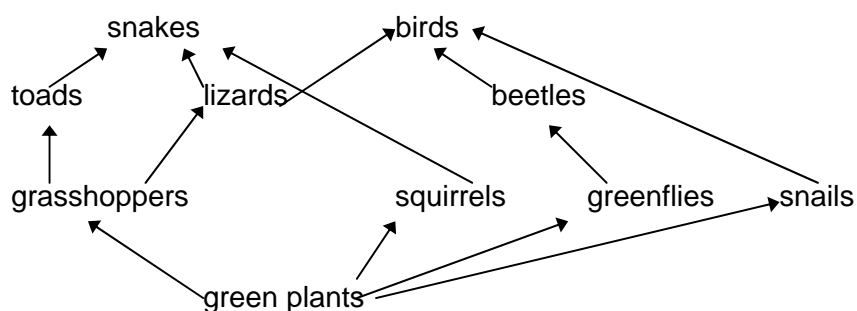
What happens in the eye when a light is switched on?

	circular muscle of iris	size of pupil
A	contracts	decreases
B	contracts	increases
C	relaxes	decreases
D	relaxes	increases

32 Which statement is true about the long-term abuse of both alcohol and heroin?

- A can be taken by injection
- B can increase the risk of AIDS
- C is a stimulant
- D produces only mild withdrawal symptoms

33 The diagram shows a food web in woodland.



In this food web a beetle is

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

34 Which processes return carbon dioxide into the atmosphere?

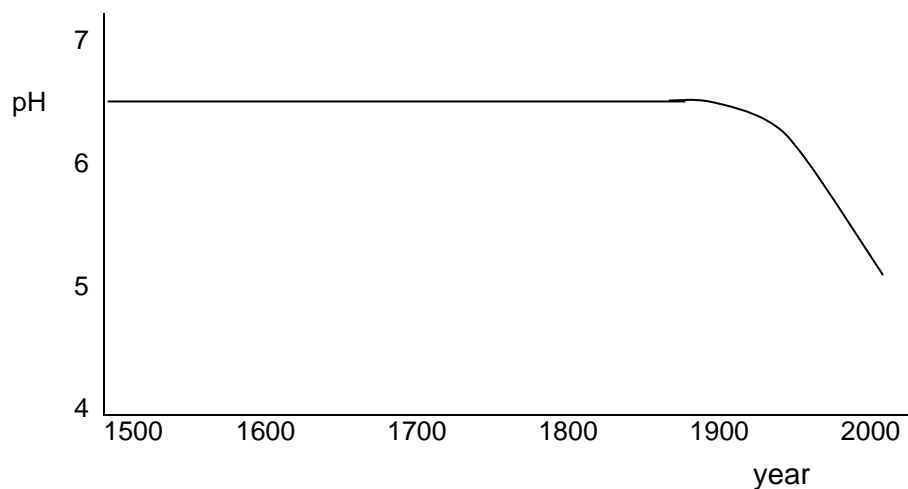
- A combustion and feeding
- B feeding and photosynthesis
- C photosynthesis and respiration
- D respiration and combustion

35 Rivers are often used to dispose of waste substances.

Which substance, when disposed of, pollutes the river for the **shortest** time?

- A hot water
- B insecticides
- C mercury
- D sewage

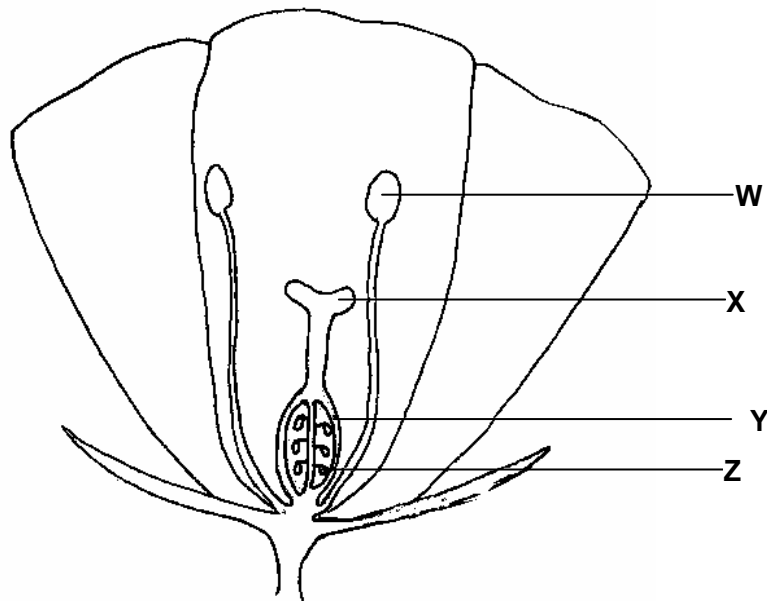
36 The graph shows how the pH of a lake has changed in the period 1500AD to 2000 AD.



What could have caused the change in the pH over the last 100 years?

- A burning of fossil fuels in factories
- B conversion of nearby woodlands to agricultural land
- C increased growth of plants in the lake
- D use of insecticides on nearby fields

37 The diagram represents a section through a flower.



What are the names of the labelled structures?

	W	X	Y	Z
A	anther	stigma	ovary	ovule
B	anther	stigma	ovule	ovary
C	stigma	anther	ovary	ovule
D	stigma	anther	ovule	ovary

38 In plant reproduction, the following processes occur.

- 1 fertilisation
- 2 growth of a pollen tube
- 3 pollination
- 4 seed germination

In which order do these processes take place?

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

39 A woman ovulates on the 7<sup>th</sup> March.  
In which week will her next menstrual period begin?

	March						
week	Sun	Mon	Tues	Weds	Thurs	Fri	Sat
	-	-	-	1	2	3	4
<b>A</b>	5	6	7	8	9	10	11
<b>B</b>	12	13	14	15	16	17	18
<b>C</b>	19	20	21	22	23	24	25
<b>D</b>	26	27	28	29	30	31	

**40** In mice, the allele for brown fur is dominant to the allele for grey fur.

What would be the phenotypes of a cross between a mouse heterozygous for brown fur and a mouse with grey fur?

- A** 100% with brown fur
- B** 100% with grey fur
- C** 75% with brown fur and 25% with grey fur
- D** 50% with brown fur and 50% with grey fur