

UNIVERSITY OF CAMBRIDGE INTERNATIONAL EXAMINATIONS
General Certificate of Education Ordinary Level

SCIENCE (CHEMISTRY, BIOLOGY)

5126/01

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.

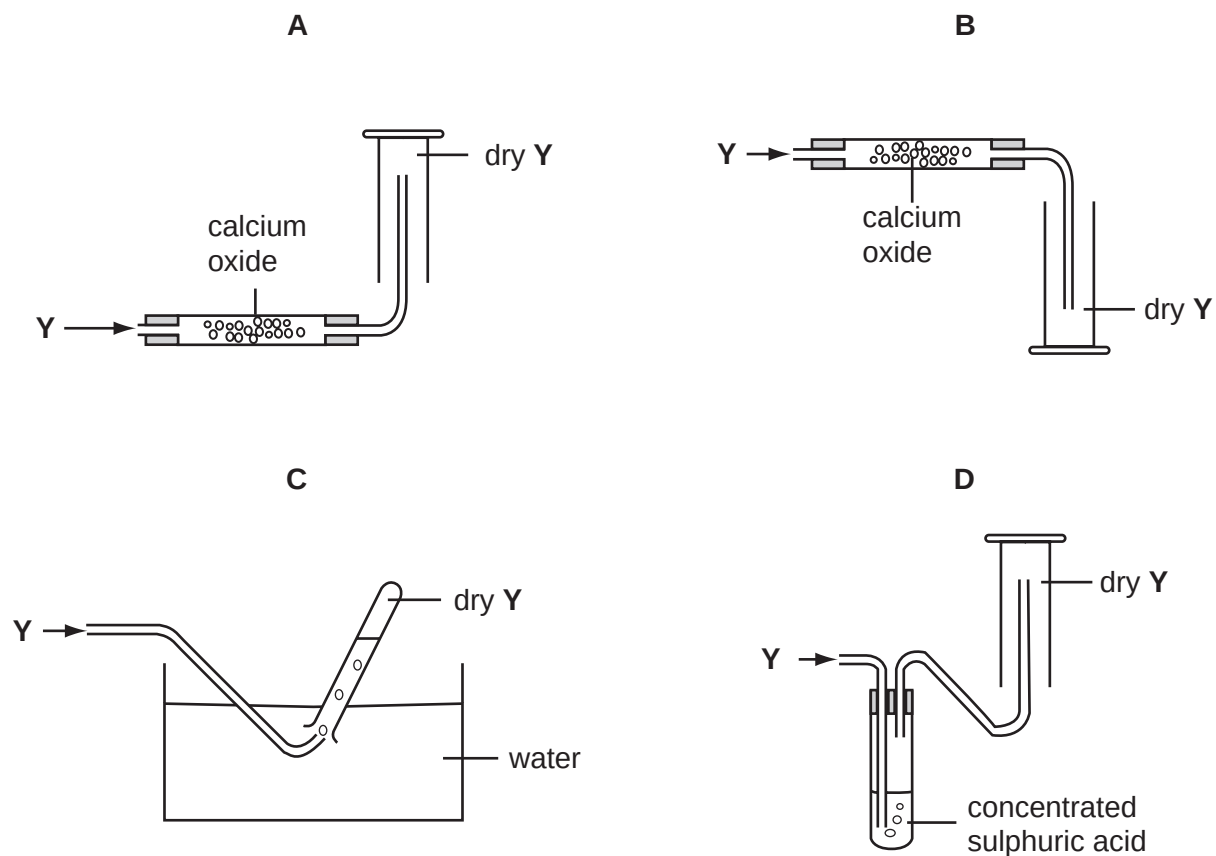
A copy of the Periodic Table is printed on page 16.

This document consists of **16** printed pages.



- 1 A gas **Y**, is less dense than air, very soluble in water and is an alkali.

Which method is used to collect a dry sample of the gas?



- 2 Which changes occur when a liquid at 50°C becomes a gas at 120°C?

	separation of particles	energy of particles	attractive force between particles
A	decreases	increases	decreases
B	decreases	decreases	increases
C	increases	increases	decreases
D	increases	decreases	increases

- 3 A nucleus is represented by the symbol ${}_{37}^{81}\text{X}$.

What does this nucleus contain?

- A** 37 electrons and 44 neutrons
- B** 37 neutrons and 81 protons
- C** 37 protons and 44 neutrons
- D** 37 protons and 81 neutrons

- 4 Element X has an electronic structure 2.8.8.1.

Element Y has an electronic structure 2.8.6.

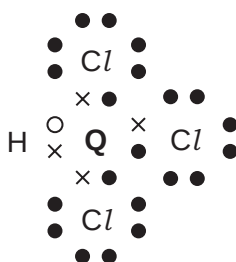
What is made when X and Y react?

	type of compound	formula
A	covalent compound	X_2Y
B	covalent compound	XY_2
C	ionic compound	X_2Y
D	ionic compound	XY_2

- 5 Element **Q** has four electrons in its outermost shell.

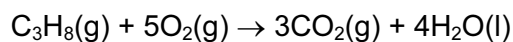
Element **Q** can combine with hydrogen and chlorine to form a compound $QHCl_3$.

The diagram shows the electronic structure of $QHCl_3$ (outer shell electrons only).



Which of these properties will this compound have?

- A** It will be a solid at room temperature.
 - B** It will be readily soluble in water.
 - C** It will be a good conductor of electricity.
 - D** It will have a low boiling point.
- 6 Propane burns completely in oxygen as shown in the equation.

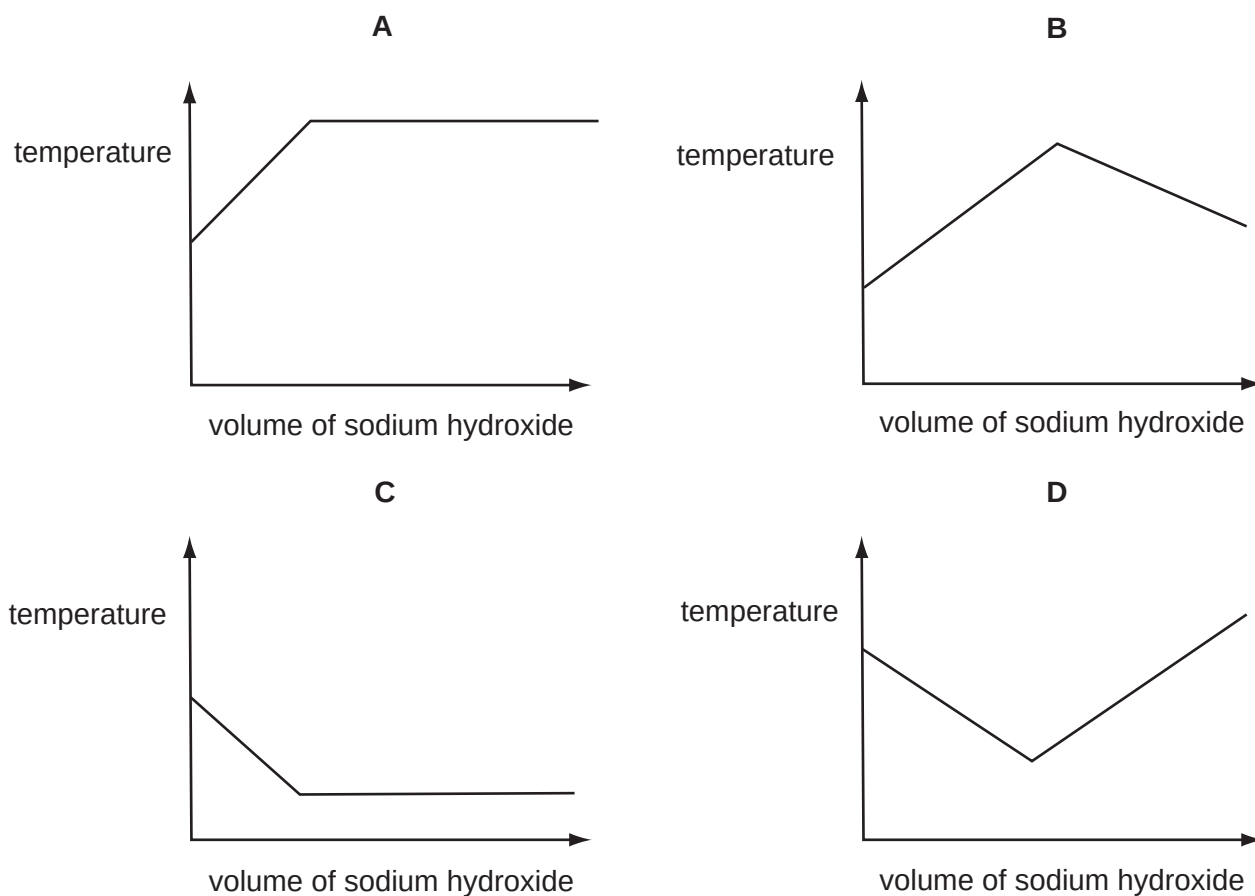


If 0.1 mol of propane is burnt completely, which volume of gaseous product is obtained, measured at room temperature and pressure?

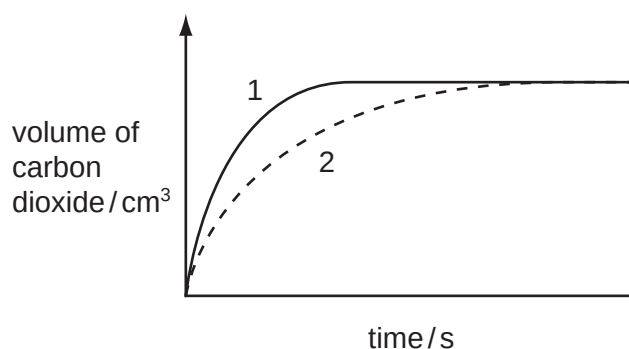
- A** 0.1 dm^3
- B** 0.3 dm^3
- C** 2.4 dm^3
- D** 7.2 dm^3

- 7 The reaction between aqueous sodium hydroxide and hydrochloric acid is exothermic.

Which graph shows the change in temperature when aqueous sodium hydroxide is added to hydrochloric acid until the alkali is present in excess?



- 8 Curve 1 shows the volume of carbon dioxide given off when 5 g of calcium carbonate lumps react completely with an excess of hydrochloric acid at 40°C.



What change could produce curve 2?

- A** use a more concentrated solution of the acid
- B** use a lower temperature
- C** use 3 g of calcium carbonate lumps
- D** use 5 g of calcium carbonate powder

- 9 Aqueous potassium sulphate can be prepared by titrating dilute sulphuric acid against aqueous potassium carbonate.

Which conclusion can be drawn from this information?

- A** Potassium carbonate is insoluble in water.
B Potassium carbonate neutralises sulphuric acid.
C Potassium sulphate is a base.
D Potassium sulphate is insoluble in water.

- 10 The table shows the results of halogen displacement experiments.

halogen added	halide solution		
	X^-	Y^-	Z^-
X_2	–	Y_2 displaced	Z_2 displaced
Y_2	no reaction	–	no reaction
Z_2	no reaction	Y_2 displaced	–

What are halogens X, Y and Z?

	X	Y	Z
A	Br	Cl	I
B	Br	I	Cl
C	Cl	Br	I
D	Cl	I	Br

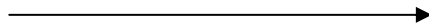
- 11 The results of adding some metals to salt solutions are shown below.

copper + zinc sulphate → no reaction

magnesium + zinc sulphate → magnesium sulphate + zinc

copper + silver sulphate → copper(II) sulphate + silver

What is the order of reactivity of the metals?

	most reactive  least reactive			
A	magnesium	copper	zinc	silver
B	magnesium	zinc	copper	silver
C	silver	copper	zinc	magnesium
D	zinc	magnesium	silver	copper

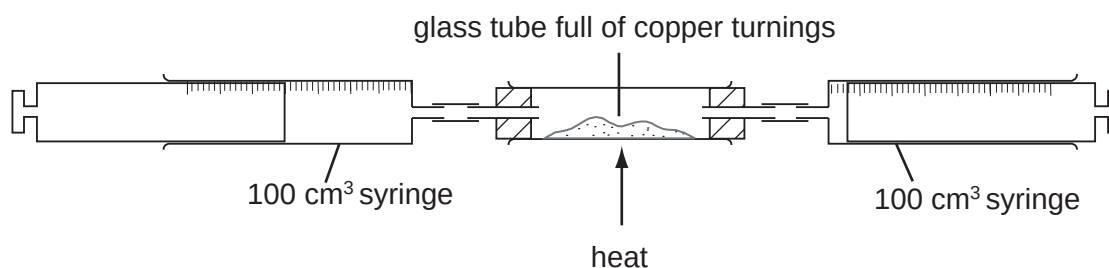
12 Which statement about the production of iron from haematite is correct?

- A Coke is used to oxidise the slag.
- B Limestone is used to produce oxygen for the coke to burn.
- C Molten iron floats on slag at the furnace base.
- D The haematite is reduced by carbon monoxide.

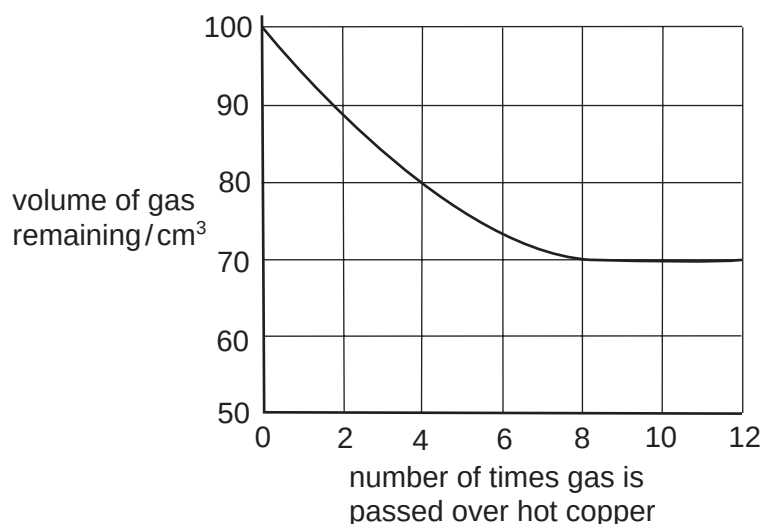
13 Why is aluminium used to make food containers that are resistant to corrosion?

- A It does not react with acids.
- B It forms a covalent oxide.
- C It forms an alloy with zinc.
- D It has a protective oxide layer on its surface.

14 A 100 cm^3 sample of bottled gas used for diving was placed in a gas syringe in the apparatus shown.



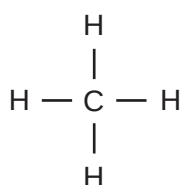
The gas was passed backward and forward over heated copper turnings. The results obtained were used to plot the graph.



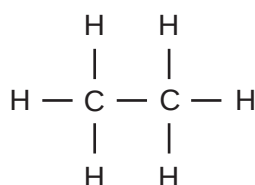
What is the percentage of oxygen in the bottled gas?

- A 20%
- B 30%
- C 70%
- D 80%

- 15 All the members of a homologous series have the same
- A empirical formula.
 - B general formula.
 - C molecular formula.
 - D physical properties.
- 16 What does **not** happen in the complete combustion of propane, C_3H_8 ?
- A a deposit of soot is formed
 - B carbon-carbon bonds break
 - C carbon-oxygen bonds form
 - D energy is released
- 17 The names and molecular structure of two alkanes are shown.



methane



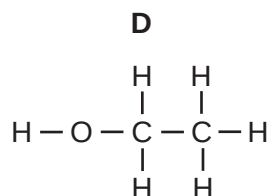
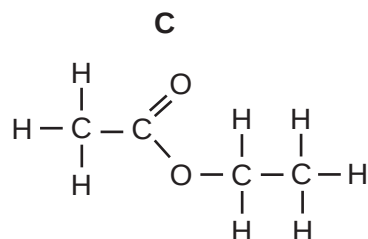
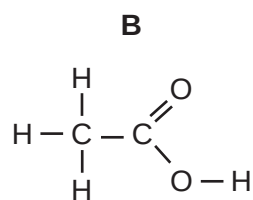
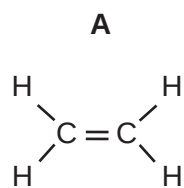
ethane

What is the next alkane in the homologous series?

	name	formula
A	butane	C_3H_6
B	butane	C_3H_8
C	propane	C_3H_6
D	propane	C_3H_8

- 18 Which compound will decolourise aqueous bromine?
- A ethane
 - B ethanoic acid
 - C ethene
 - D poly(ethene)

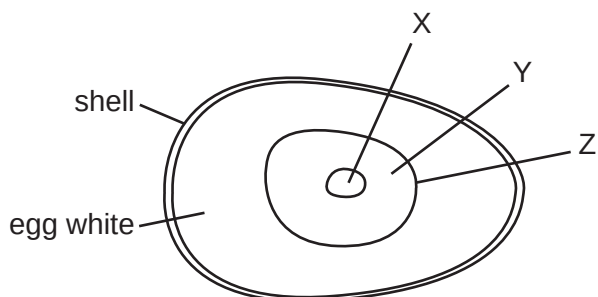
19 Which structure shows a compound that reacts with ethanol to give an ester?



20 Which of the following is a polyester?

- A** nylon
- B** poly(ethene)
- C** protein
- D** Terylene

21 The yellow part of a hen's egg is a large cell containing a lot of yolk. The diagram shows an unfertilised hen's egg.



What do the labels represent?

	cell membrane	cytoplasm	nucleus
A	X	Y	Z
B	X	Z	Y
C	Z	X	Y
D	Z	Y	X

22 A mature xylem vessel in a woody plant has

- A** a cell wall only.
- B** a cell wall and a vacuole.
- C** a cell membrane, cytoplasm and a nucleus.
- D** cytoplasm, a cell wall and a nucleus.

23 A piece of plant tissue is transferred from a beaker of water into a 10 % sucrose solution.

What happens?

	movement of water	volume of tissue cells
A	enters the cells	decreases
B	enters the cells	increases
C	leaves the cells	decreases
D	leaves the cells	increases

24 Under which conditions does amylase act on starch most quickly?

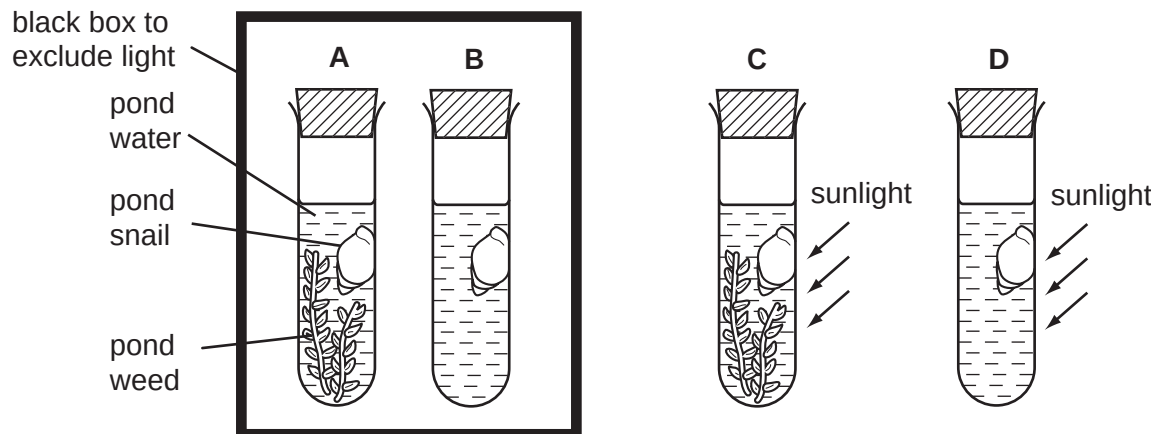
	pH	temperature
A	acidic	30 °C
B	acidic	60 °C
C	neutral	30 °C
D	neutral	60 °C

25 What is the function of chlorophyll in plants?

- A** to absorb carbon dioxide
- B** to absorb light
- C** to absorb oxygen
- D** to absorb water

26 Four test-tubes are set up as shown.

In which test-tube will the concentration of carbon dioxide increase most rapidly?



27 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.

28 Where in the alimentary canal is most water absorbed?

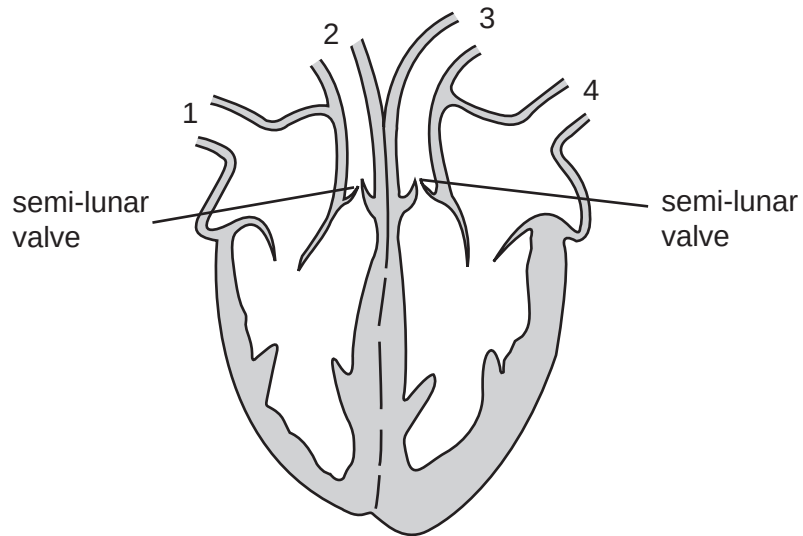
- A colon
- B ileum
- C oesophagus
- D stomach

29 A green plant starts to wilt. It is then given water, and after a short time it recovers.

Which process causes this recovery?

- A assimilation
- B osmosis
- C respiration
- D transpiration

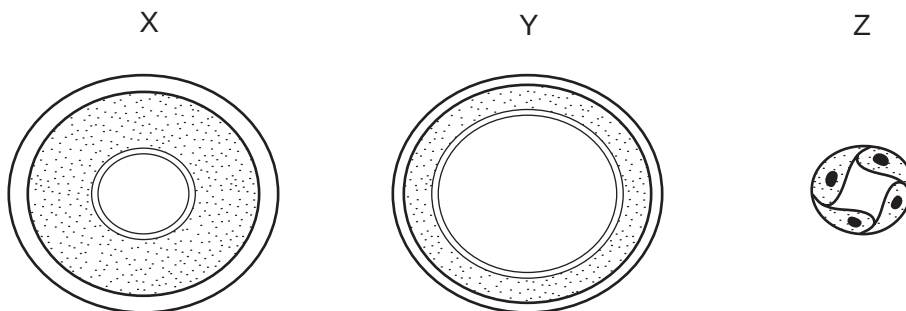
30 The diagram shows a section through the human heart.



What happens as blood is being pumped to the lungs?

	semi-lunar valves	vessel through which blood passes to the lungs
A	closed	4
B	closed	3
C	open	2
D	open	1

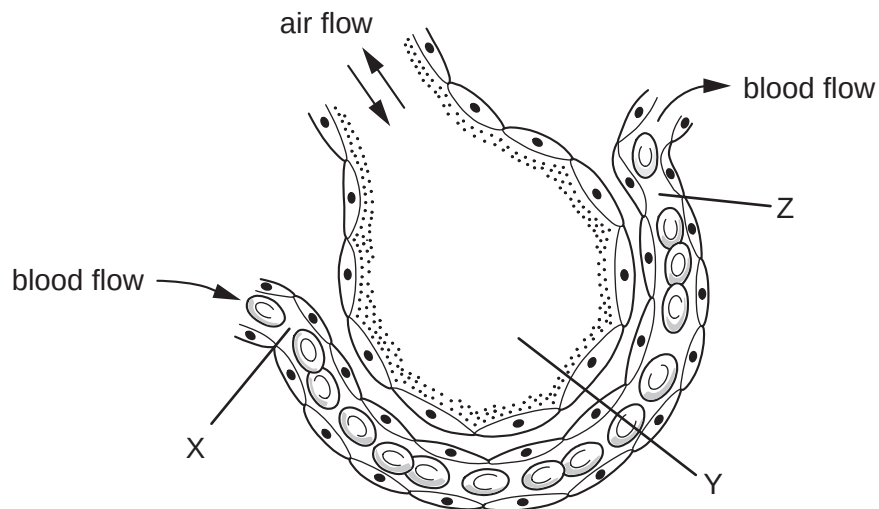
31 The diagram shows cross-sections of three types of blood vessel, not drawn to the same scale.



What are X, Y and Z?

	X	Y	Z
A	artery	capillary	vein
B	artery	vein	capillary
C	vein	artery	capillary
D	vein	capillary	artery

32 The diagram shows a section of an alveolus and a capillary in a lung.



What are the relative concentrations of **carbon dioxide** at X, Y and Z?

	X	Y	Z
A	high	high	high
B	high	low	low
C	low	high	high
D	low	high	low

33 A person is sitting in a dark room.

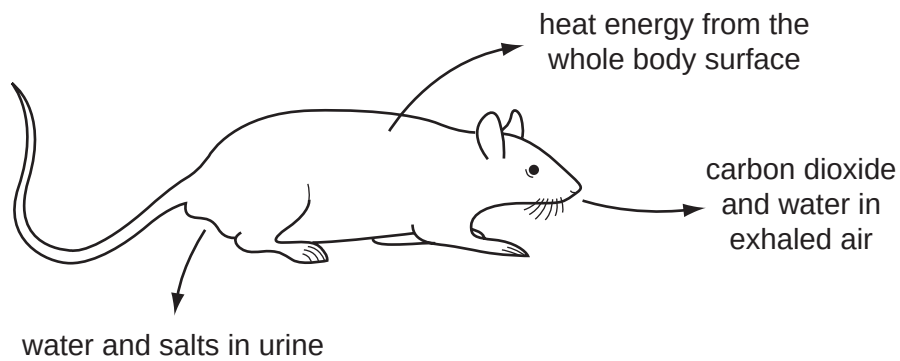
What happens in the eye when a light is switched on?

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

34 Which statement is true of heroin and also true of excessive use of alcohol?

- A** Their use can lead to habitual criminal behaviour.
- B** They are stimulants.
- C** They are usually taken by injection.
- D** They produce only mild withdrawal symptoms.

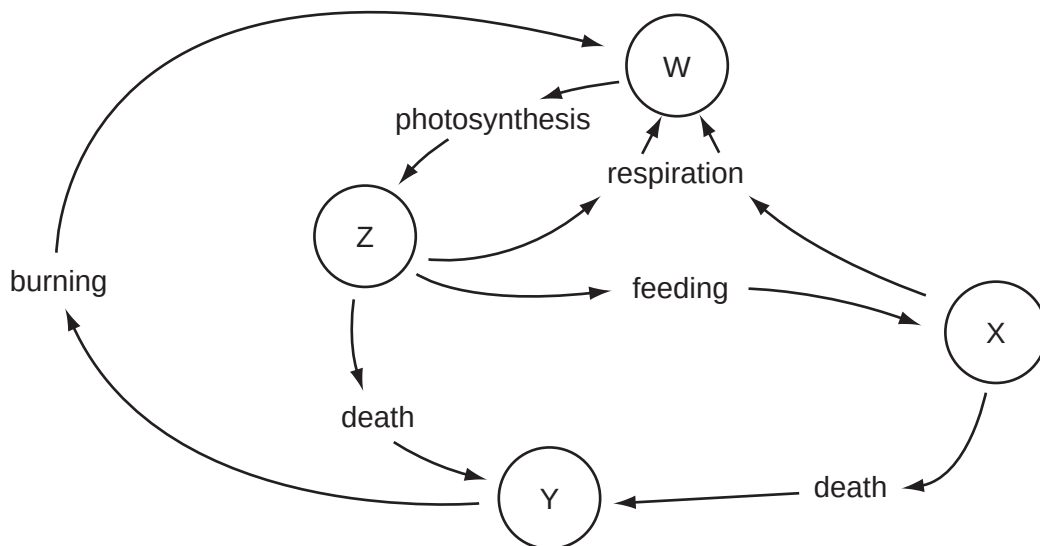
35 The diagram shows losses from a rat to the environment.



What will **not** be returned to the ecosystem and recycled?

- A carbon dioxide
- B heat energy
- C salts
- D water

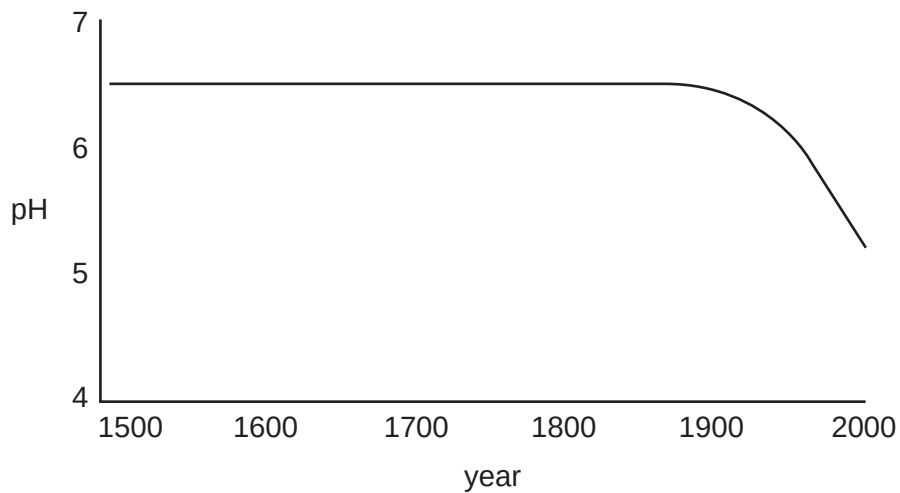
36 The diagram shows some stages in the carbon cycle. W, X, Y and Z are carbon compounds.



What is W?

- A carbon compounds in animals
- B carbon compounds in plants
- C carbon dioxide
- D coal and oil

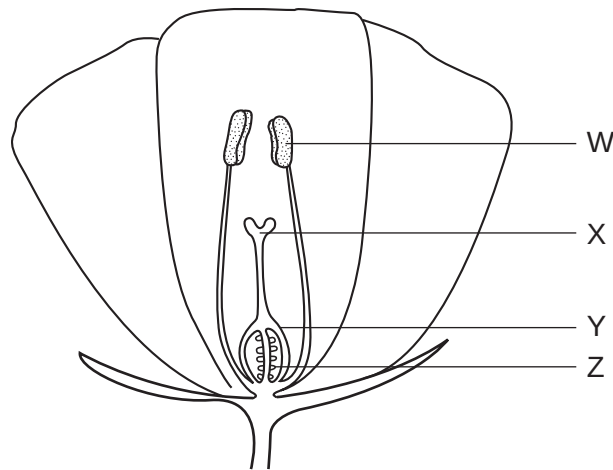
37 The graph shows how the pH of a lake has changed in the period 1500 AD to 2000 AD.



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

38 The diagram shows 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

39 Which line indicates hormonal and mechanical birth control methods?

	hormonal	mechanical
A	pill	spermicide
B	pill	intra-uterine device (IUD)
C	condom	spermicide
D	condom	intra-uterine device (IUD)

40 A human cell contains all of the following.

Which is the smallest in size?

- A** gene
- B** nucleus
- C** X-chromosome
- D** Y-chromosome

The volume of one mole of any gas is 24 dm^3 at room temperature and pressure (r.t.p.).