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.

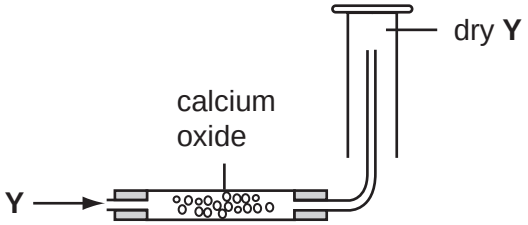
Each correct answer will score one mark. A mark will not be deducted for a wrong answer.
Any rough working should be done in this booklet.
A copy of the Periodic Table is printed on page 16.

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

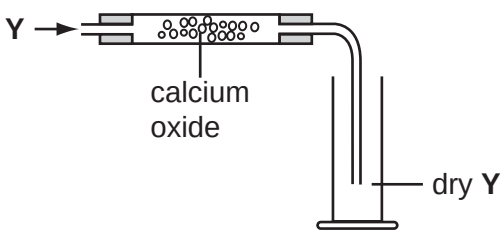
1 A gas **Y**, is less dense than air, very soluble in water and is an alkali.

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

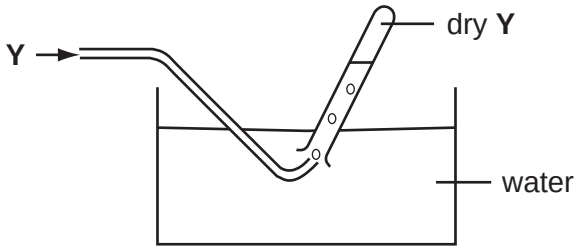
A



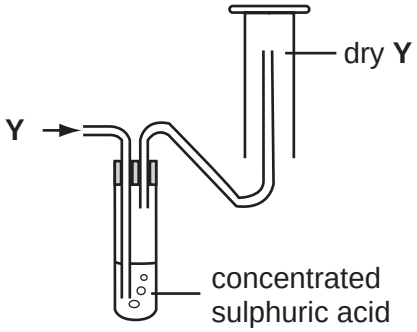
B



C



D



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 $^{81}_{37}X$.

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.

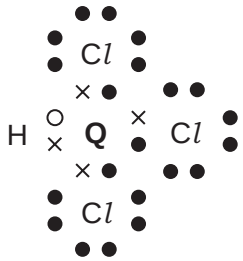
What is made when X and Y react?

	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 **Q**HCl_3.

The diagram shows the electronic structure of **Q**HCl_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.

$$C_3H_8(g) + 5O_2(g) \rightarrow 3CO_2(g) + 4H_2O(l)$$

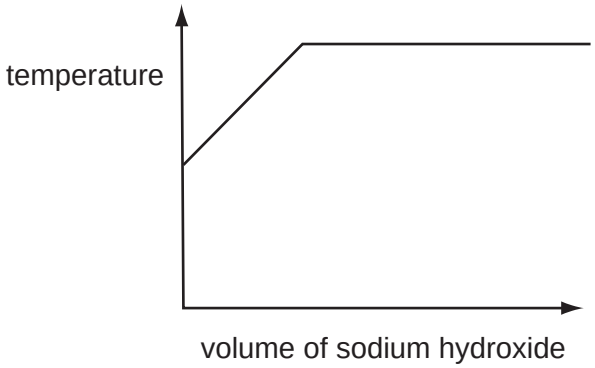
If 0.1 mol of propane is burnt completely, which volume of gaseous product is obtained, measured at room temperature and pressure?

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

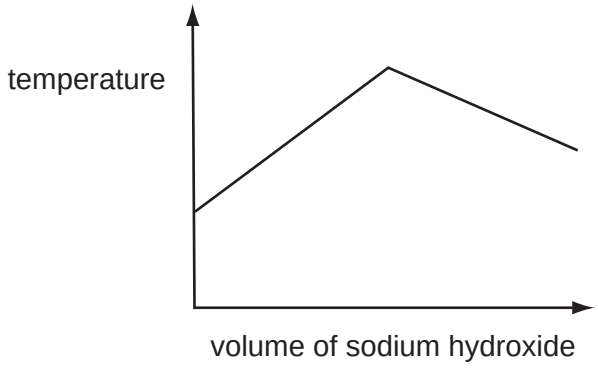
7 The reaction between aqueous sodium hydroxide and hydrochloric acid is exothermic.

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

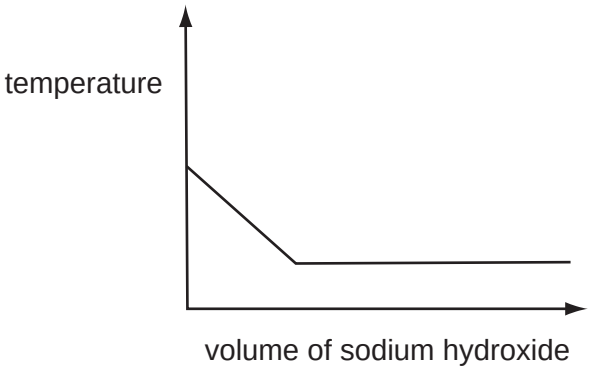
A



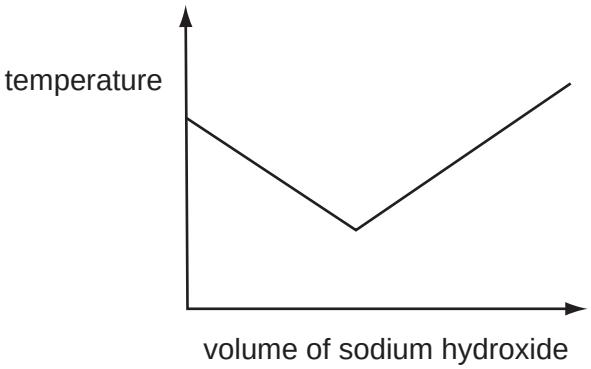
B



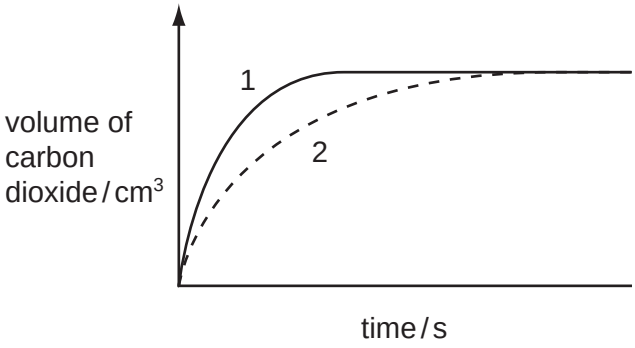
C



D



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	C*l*	I
B	Br	I	C*l*
C	C*l*	Br	I
D	C*l*	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

[Turn over

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?

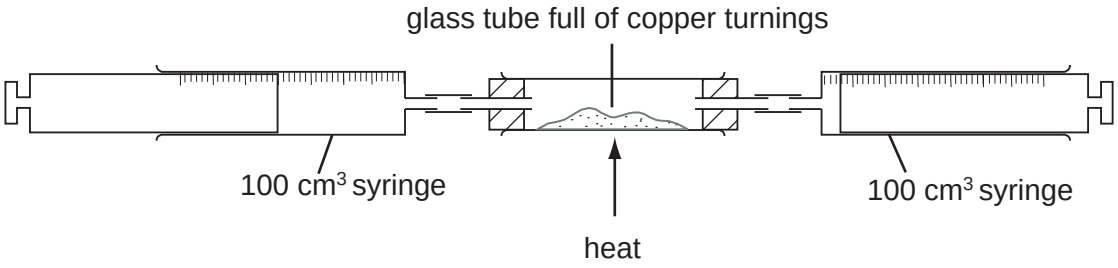
A It does not react with acids.

B It forms a covalent oxide.

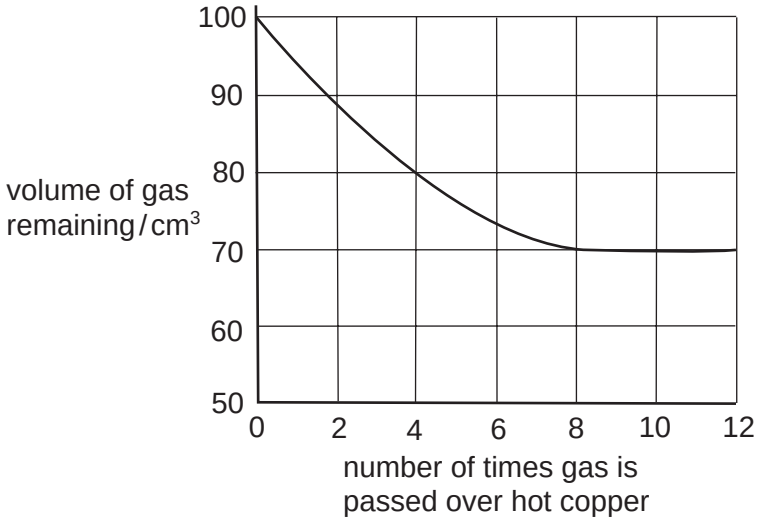
C It forms an alloy with zinc.

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?

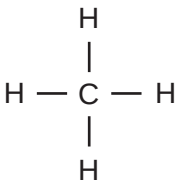
A a deposit of soot is formed

B carbon-carbon bonds break

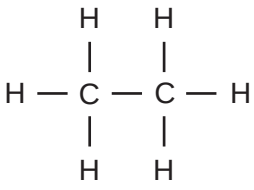
C carbon-oxygen bonds form

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

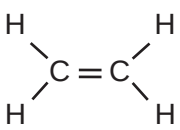
B ethanoic acid

C ethene

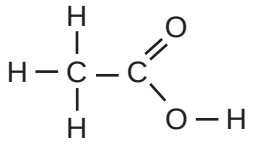
D poly(ethene)

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

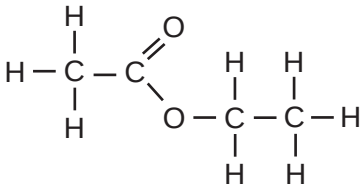
A



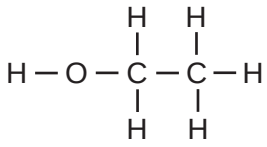
B



C



D



20 Which of the following is a polyester?

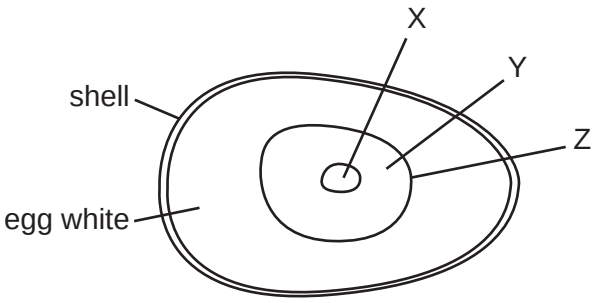
A nylon

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

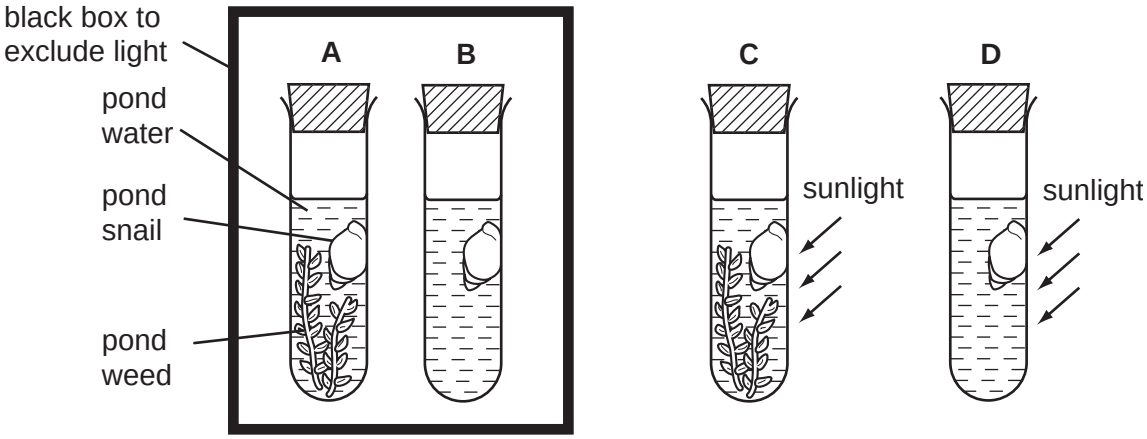
B to absorb light

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?

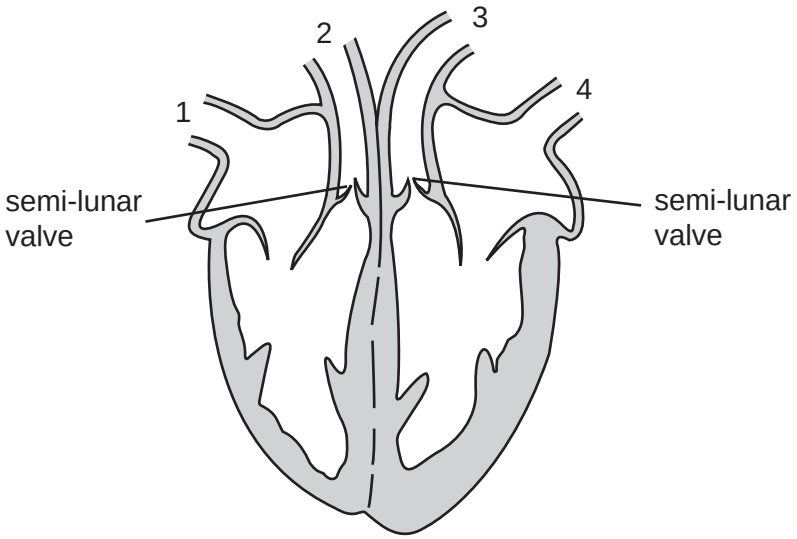
A assimilation

B osmosis

C respiration

D transpiration

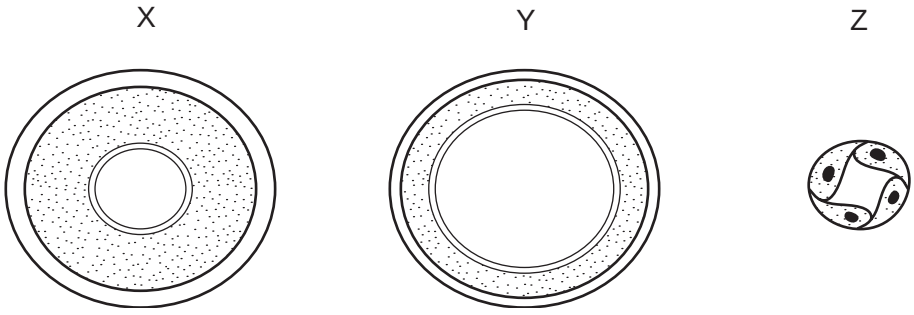
30 The diagram shows a section through the human heart.



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

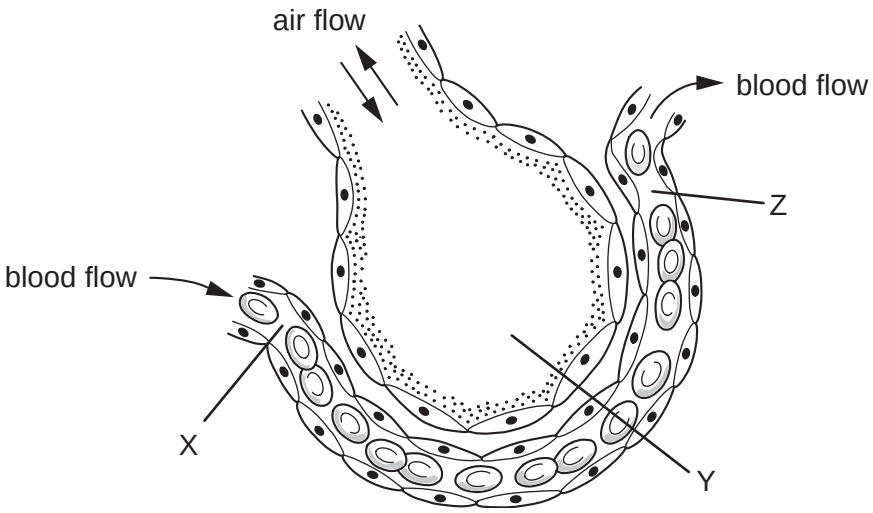
31 The diagram shows cross-sections of three types of blood vessel, not drawn to the same scale.



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?

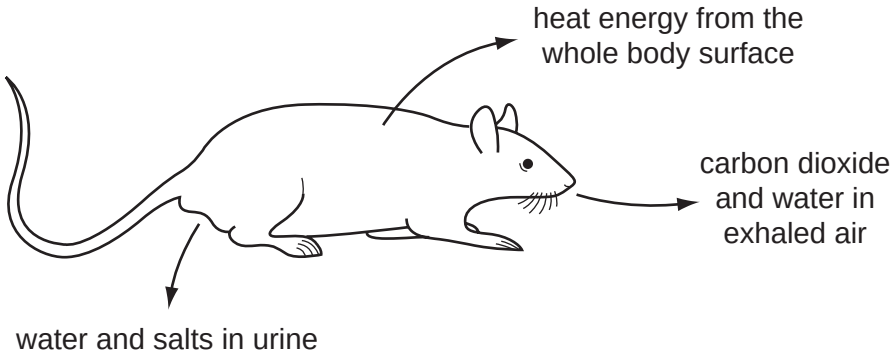
A Their use can lead to habitual criminal behaviour.

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?

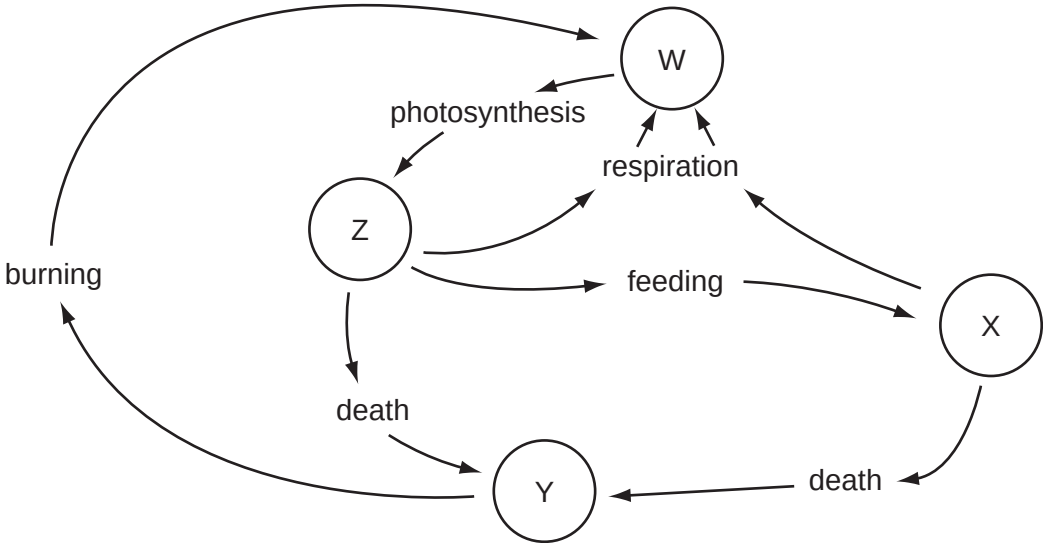
A carbon dioxide

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?

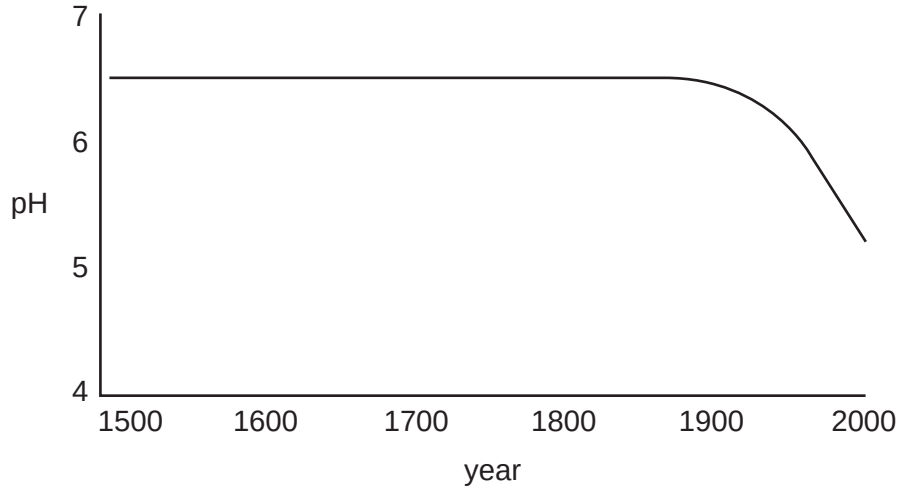
A carbon compounds in animals

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?

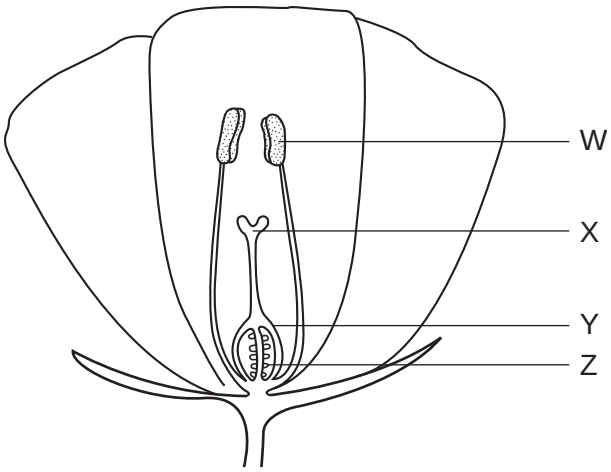
A burning of fossil fuels in factories

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

DATA SHEET
The Periodic Table of the Elements

Group																		
I	II										III	IV	V	VI	VII	0
																4 He Helium 2
					1 H Hydrogen 1							12 C Carbon 6	14 N Nitrogen 7	16 O Oxygen 8	19 F Fluorine 9	20 Ne Neon 10
7 Li Lithium 3	9 Be Beryllium 4										11 B Boron 5	28 Si Silicon 14	31 P Phosphorus 15	32 S Sulphur 16	35.5 Cl Chlorine 17	40 Ar Argon 18
23 Na Sodium 11	24 Mg Magnesium 12										27 Al Aluminium 13	73 Ge Germanium 32	75 As Arsenic 33	79 Se Selenium 34	80 Br Bromine 35	84 Kr Krypton 36
39 K Potassium 19	40 Ca Calcium 20	45 Sc Scandium 21	48 Ti Titanium 22	51 V Vanadium 23	52 Cr Chromium 24	55 Mn Manganese 25	56 Fe Iron 26	59 Co Cobalt 27	59 Ni Nickel 28	64 Cu Copper 29	65 Zn Zinc 30	119 Sn Tin 50	122 Sb Antimony 51	128 Te Tellurium 52	127 I Iodine 53	131 Xe Xenon 54
85 Rb Rubidium 37	88 Sr Strontium 38	89 Y Yttrium 39	91 Zr Zirconium 40	93 Nb Niobium 41	96 Mo Molybdenum 42	Tc Technetium 43	101 Ru Ruthenium 44	103 Rh Rhodium 45	106 Pd Palladium 46	108 Ag Silver 47	112 Cd Cadmium 48	115 In Indium 49	204 Tl Thallium 81	207 Pb Lead 82	209 Bi Bismuth 83	Po Polonium 84	At Astatine 85	Rn Radon 86
133 Cs Caesium 55	137 Ba Barium 56	139 La Lanthanum 57 *	178 Hf Hafnium 72	181 Ta Tantalum 73	184 W Tungsten 74	186 Re Rhenium 75	190 Os Osmium 76	192 Ir Iridium 77	195 Pt Platinum 78	197 Au Gold 79	201 Hg Mercury 80	204 Tl Thallium 81	207 Pb Lead 82	209 Bi Bismuth 83	Po Polonium 84	At Astatine 85	Rn Radon 86
Fr Francium 87	226 Ra Radium 88	227 Ac Actinium 89																

140 Ce Cerium 58	141 Pr Praseodymium 59	144 Nd Neodymium 60	Pm Promethium 61	150 Sm Samarium 62	152 Eu Europium 63	157 Gd Gadolinium 64	159 Tb Terbium 65	162 Dy Dysprosium 66	165 Ho Holmium 67	167 Er Erbium 68	169 Tm Thulium 69	173 Yb Ytterbium 70	175 Lu Lutetium 71
232 Th Thorium 90	Pa Protactinium 91	238 U Uranium 92	Np Neptunium 93	Pu Plutonium 94	Am Americium 95	Cm Curium 96	Bk Berkelium 97	Cf Californium 98	Es Einsteinium 99	Fm Fermium 100	Md Mendelevium 101	No Nobelium 102	Lr Lawrencium 103

*58-71 Lanthanoid series
90-103 Actinoid series

Key

a / X / b	a = relative atomic mass
	X = atomic symbol
	b = proton (atomic) number

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