

UNIVERSITY OF CAMBRIDGE INTERNATIONAL EXAMINATIONS  
General Certificate of Education Ordinary Level

**COMBINED SCIENCE**

**5129/01**

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.

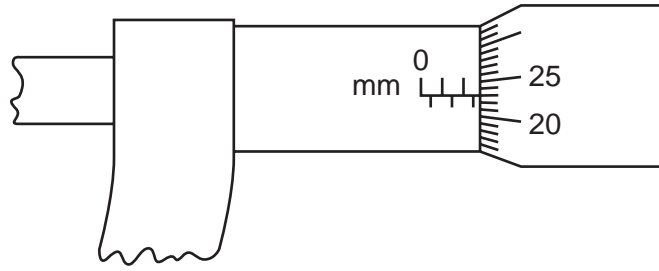
Any rough working should be done in this booklet.

A copy of the Periodic Table is printed on page 20.

This document consists of **17** printed pages and **3** blank pages.

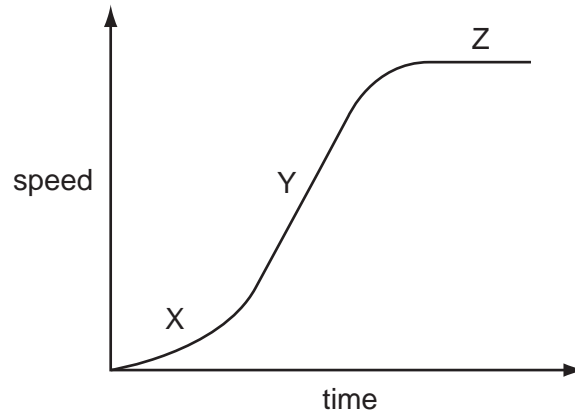


- 1 The diagram shows a micrometer.



Which reading is shown?

- A** 2.23 mm      **B** 2.73 mm      **C** 3.23 mm      **D** 5.23 mm
- 2 The graph shows how the speed of a car changes with time.

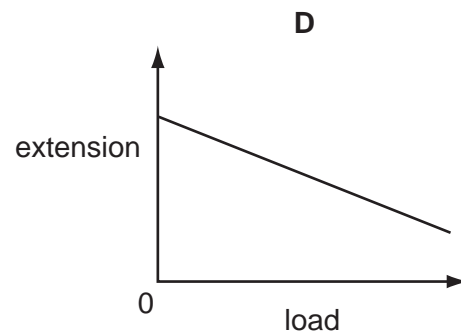
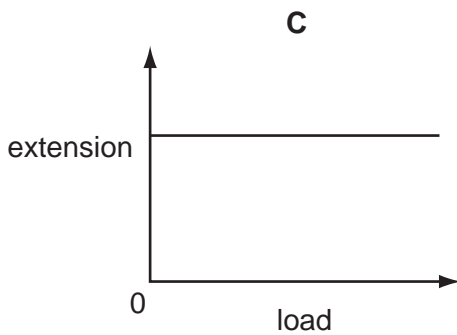
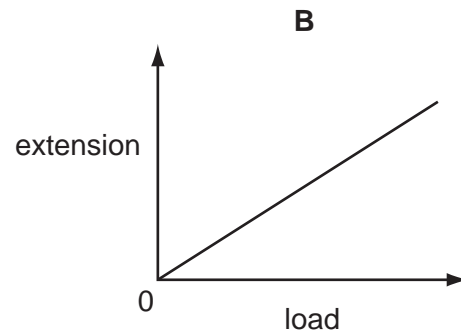
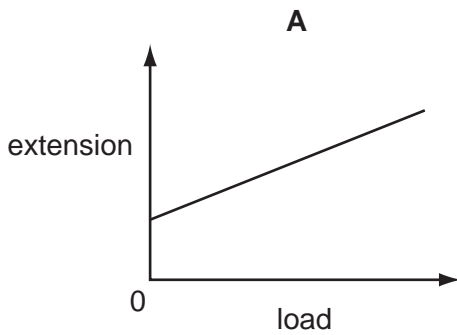


Which statement is correct?

- A** at X the car has constant acceleration  
**B** at Y the car has acceleration which is not constant  
**C** at Z the car has constant speed  
**D** at Z the car is at rest

- 3 A student adds different loads to the end of a spring. She finds the extension in each case and plots a graph of extension against load.

What is the correct graph?

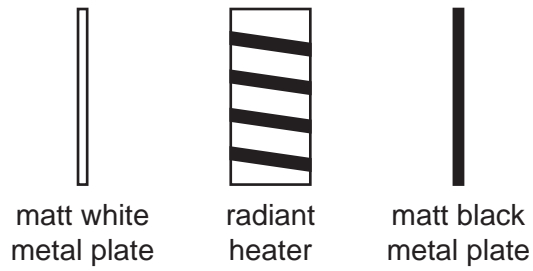


- 4 A man weighs 600 N. He runs up stairs of total height 4 metres in 3 seconds.

How much power is exerted by the man?

- A** 450 W      **B** 800 W      **C** 2400 W      **D** 7200 W

- 5 Two identical metal plates are painted, one matt white and the other matt black. These are placed at equal distances from a radiant heater as shown. The heater is turned on for five minutes.



Which metal plate absorbs more energy and which plate emits more energy in this time?

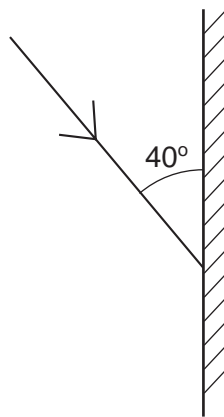
	absorbs more	emits more
<b>A</b>	black	black
<b>B</b>	black	white
<b>C</b>	white	black
<b>D</b>	white	white

- 6 A surf-board moves at a speed of 5 m / s on the crest of a wave. The distance between successive wave crests is 10 m.

What is the frequency of the wave motion?

- A** 0.5 Hz      **B** 2 Hz      **C** 5 Hz      **D** 10 Hz

- 7 The diagram shows a single ray of light being directed at a plane mirror.



What are the angles of incidence and reflection?

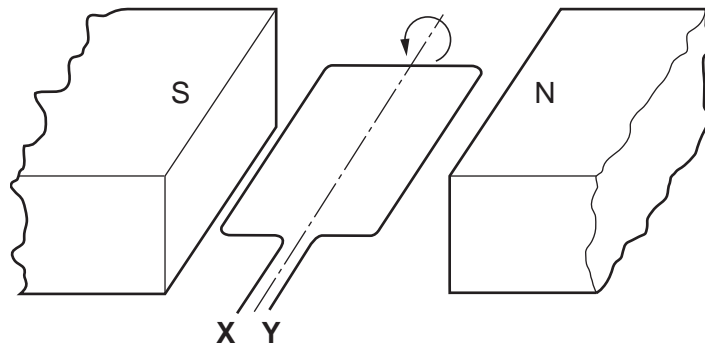
	angle of incidence	angle of reflection
<b>A</b>	40°	40°
<b>B</b>	40°	50°
<b>C</b>	50°	40°
<b>D</b>	50°	50°

- 8 A battery moves a charge of 60 C around a circuit in a time of 20 s.

What is the average current in the circuit?

- A** 0.3 A                      **B** 3.0 A                      **C** 40 A                      **D** 1200 A
- 9 Which is the **highest** rated appliance that can be connected to the 240 V mains supply using a plug with a 3 A fuse?
- A** a 60W light bulb  
**B** a 100W light bulb  
**C** a 200W television  
**D** a 500W heater
- 10 Which of the following would be repelled by the S pole of a bar magnet?
- A** a copper bar  
**B** a soft iron bar  
**C** the N pole of a second bar magnet  
**D** the S pole of a second bar magnet

11 The diagram shows a coil in a magnetic field.



When the coil is part of an a.c. generator, what must be connected directly to **X** and **Y**?

- A a.c. supply
- B carbon brushes
- C slip rings
- D soft-iron core

12 Which table correctly identifies the locations of protons, neutrons and electrons in an atom?

**A**

	nucleus	
	inside	outside
electrons	✓	
neutrons	✓	
protons		✓

**B**

	nucleus	
	inside	outside
electrons		✓
neutrons	✓	
protons	✓	

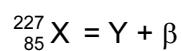
**C**

	nucleus	
	inside	outside
electrons	✓	
neutrons		✓
protons		✓

**D**

	nucleus	
	inside	outside
electrons		✓
neutrons		✓
protons	✓	

13 A radioactive nucleus X, decays by emitting a beta-particle to form a nucleus, Y.

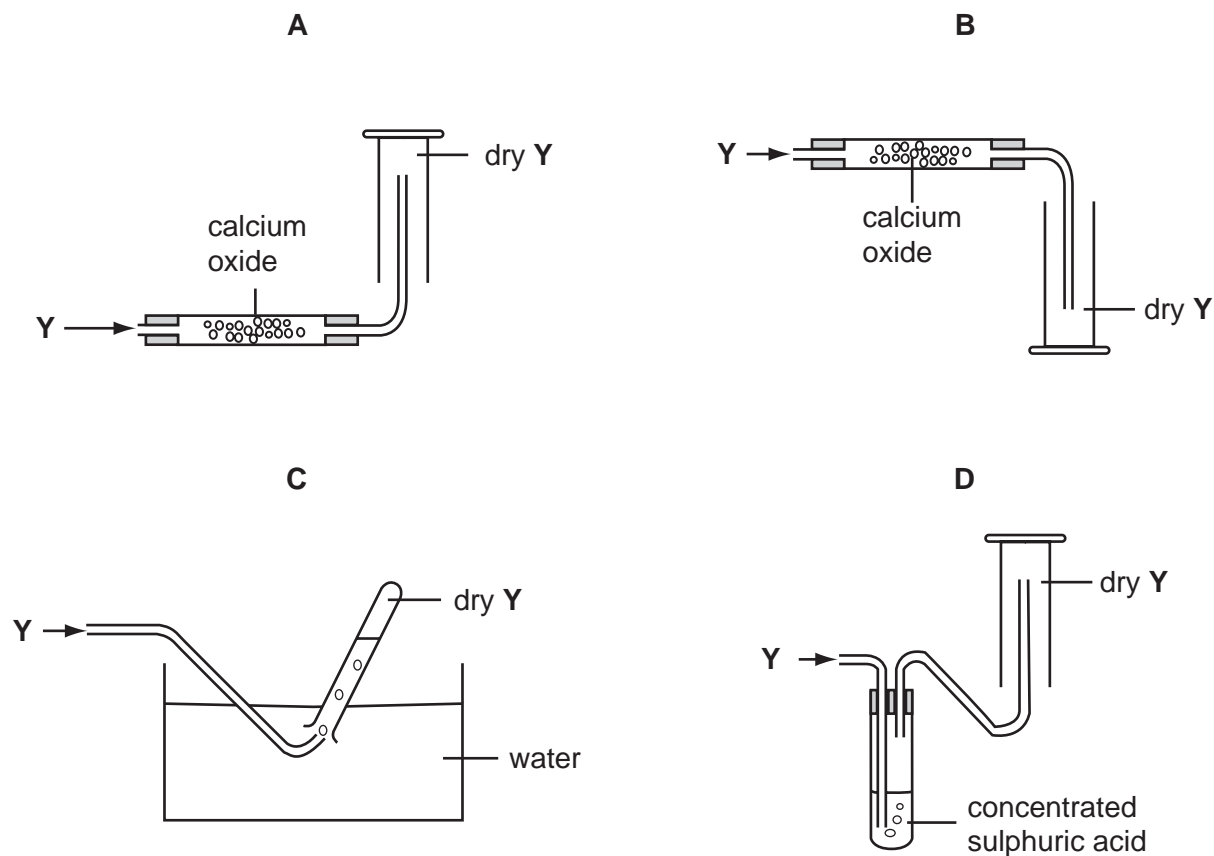


What represents nucleus Y?

- A  ${}_{83}^{223}\text{Y}$
- B  ${}_{84}^{225}\text{Y}$
- C  ${}_{85}^{228}\text{Y}$
- D  ${}_{86}^{227}\text{Y}$

14 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?



15 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
<b>A</b>	decreases	increases	decreases
<b>B</b>	decreases	decreases	increases
<b>C</b>	increases	increases	decreases
<b>D</b>	increases	decreases	increases

16 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

17 Element X has an electronic structure 2.8.8.1.

Element Y has an electronic structure 2.8.6.

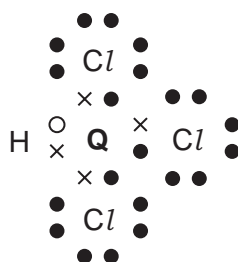
What is made when X and Y react?

	type of compound	formula
<b>A</b>	covalent compound	$X_2Y$
<b>B</b>	covalent compound	$XY_2$
<b>C</b>	ionic compound	$X_2Y$
<b>D</b>	ionic compound	$XY_2$

18 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.

19 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.



20 The table shows the results of halogen displacement experiments.

halogen added	halide solution		
	X <sup>-</sup>	Y <sup>-</sup>	Z <sup>-</sup>
X <sub>2</sub>	–	Y <sub>2</sub> displaced	Z <sub>2</sub> displaced
Y <sub>2</sub>	no reaction	–	no reaction
Z <sub>2</sub>	no reaction	Y <sub>2</sub> displaced	–

What are halogens X, Y and Z?

	X	Y	Z
<b>A</b>	Br	Cl	I
<b>B</b>	Br	I	Cl
<b>C</b>	Cl	Br	I
<b>D</b>	Cl	I	Br

21 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 $\longrightarrow$ least reactive			
<b>A</b>	magnesium	copper	zinc	silver
<b>B</b>	magnesium	zinc	copper	silver
<b>C</b>	silver	copper	zinc	magnesium
<b>D</b>	zinc	magnesium	silver	copper

22 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.

23 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.

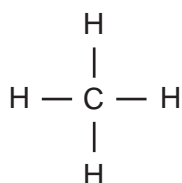
24 All the members of a homologous series have the same

- A empirical formula.
- B general formula.
- C molecular formula.
- D physical properties.

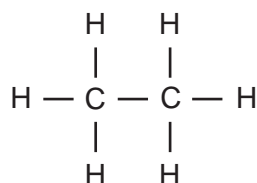
25 What does **not** happen in the complete combustion of propane,  $C_3H_8$ ?

- A a deposit of soot is formed
- B carbon-carbon bonds break
- C carbon-oxygen bonds form
- D energy is released

26 The names and molecular structure of two alkanes are shown.



methane



ethane

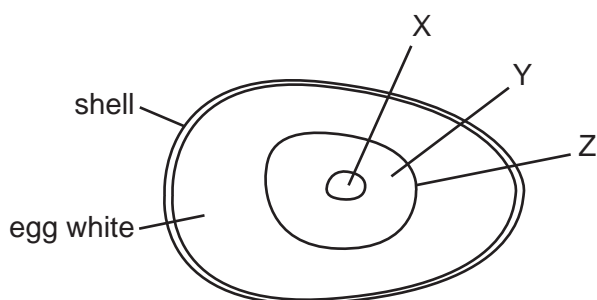
What is the next alkane in the homologous series?

	name	formula
<b>A</b>	butane	$C_3H_6$
<b>B</b>	butane	$C_3H_8$
<b>C</b>	propane	$C_3H_6$
<b>D</b>	propane	$C_3H_8$

27 Which compound will decolourise aqueous bromine?

- A ethane
- B ethanoic acid
- C ethene
- D poly(ethene)

28 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
<b>A</b>	X	Y	Z
<b>B</b>	X	Z	Y
<b>C</b>	Z	X	Y
<b>D</b>	Z	Y	X

29 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
<b>A</b>	enters the cells	decreases
<b>B</b>	enters the cells	increases
<b>C</b>	leaves the cells	decreases
<b>D</b>	leaves the cells	increases

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

	pH	temperature
<b>A</b>	acidic	30 °C
<b>B</b>	acidic	60 °C
<b>C</b>	neutral	30 °C
<b>D</b>	neutral	60 °C

31 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

32 Where in the alimentary canal is most water absorbed?

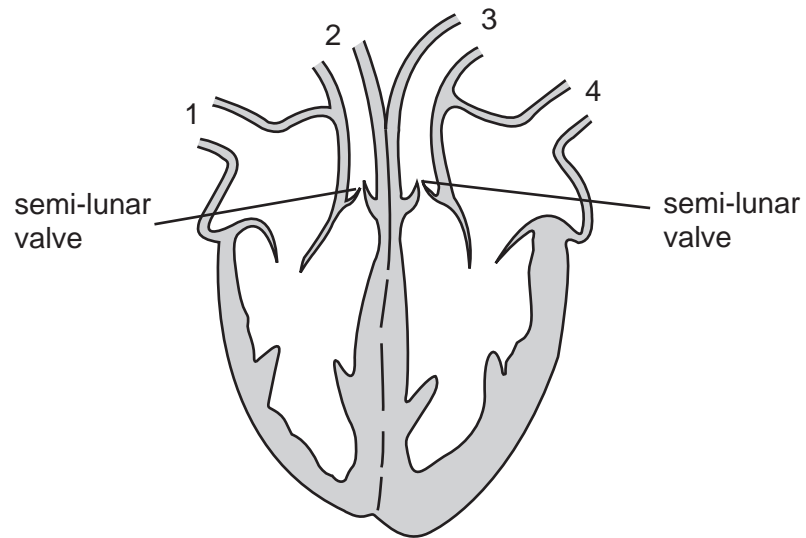
- A** colon
- B** ileum
- C** oesophagus
- D** stomach

33 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

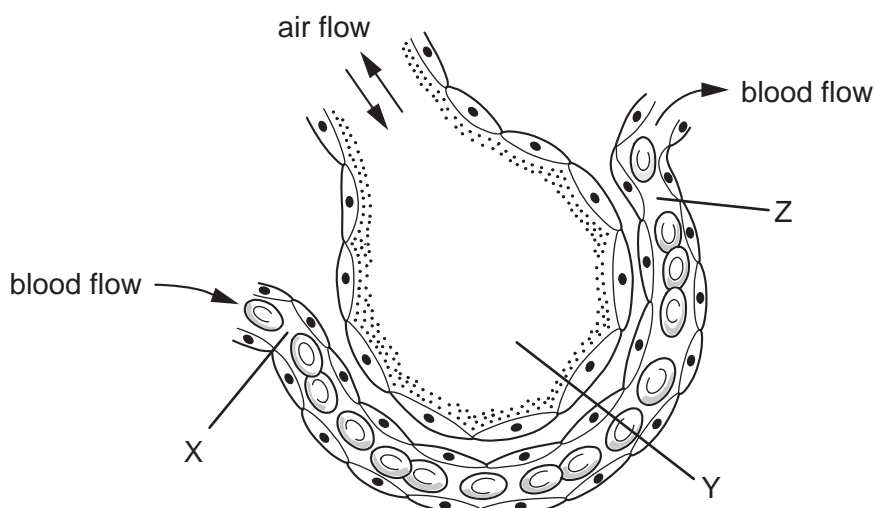
34 The diagram shows a section through the human heart.



What happens as blood is being pumped to the lungs?

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

35 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
<b>A</b>	high	high	high
<b>B</b>	high	low	low
<b>C</b>	low	high	high
<b>D</b>	low	high	low

36 A person is sitting in a dark room.

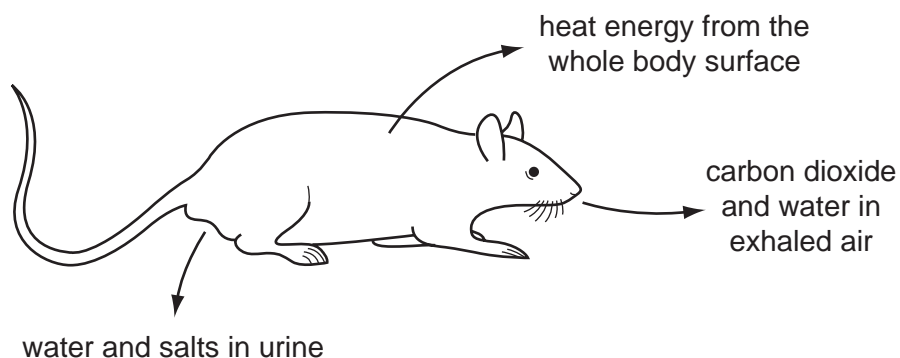
What happens in the eye when a light is switched on?

	circular muscle of iris	size of pupil
<b>A</b>	contracts	decreases
<b>B</b>	contracts	increases
<b>C</b>	relaxes	decreases
<b>D</b>	relaxes	increases

37 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.

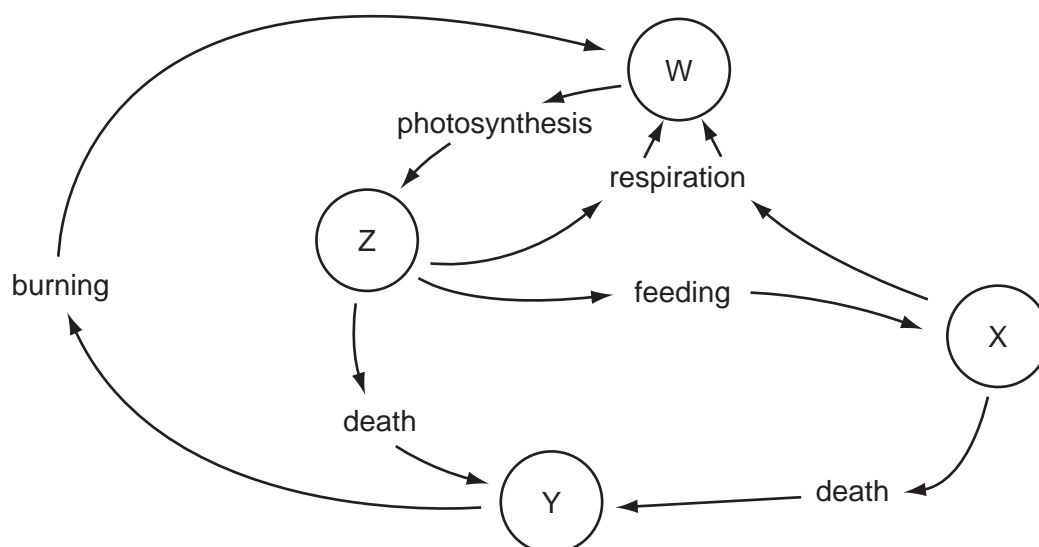
38 The diagram shows losses from a rat to the environment.



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

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

39 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

40 Which line indicates hormonal and mechanical birth control methods?

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







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**DATA SHEET**  
**The Periodic Table of the Elements**

		Group															
		I	II	III	IV	V	VI	VII	0								
		1 <b>H</b> Hydrogen 1										4 <b>He</b> Helium 2					
7 <b>Li</b> Lithium 3	9 <b>Be</b> Beryllium 4											20 <b>Ne</b> Neon 10					
23 <b>Na</b> Sodium 11	24 <b>Mg</b> Magnesium 12											35.5 <b>Cl</b> Chlorine 17					
39 <b>K</b> Potassium 19	40 <b>Ca</b> Calcium 20	45 <b>Sc</b> Scandium 21	48 <b>Ti</b> Titanium 22	51 <b>V</b> Vanadium 23	52 <b>Cr</b> Chromium 24	55 <b>Mn</b> Manganese 25	56 <b>Fe</b> Iron 26	59 <b>Co</b> Cobalt 27	59 <b>Ni</b> Nickel 28	64 <b>Cu</b> Copper 29	65 <b>Zn</b> Zinc 30	70 <b>Ga</b> Gallium 31	73 <b>Ge</b> Germanium 32	75 <b>As</b> Arsenic 33	79 <b>Se</b> Selenium 34	80 <b>Br</b> Bromine 35	84 <b>Kr</b> Krypton 36
85 <b>Rb</b> Rubidium 37	88 <b>Sr</b> Strontium 38	89 <b>Y</b> Yttrium 39	91 <b>Zr</b> Zirconium 40	93 <b>Nb</b> Niobium 41	96 <b>Mo</b> Molybdenum 42	101 <b>Ru</b> Ruthenium 44	106 <b>Pd</b> Palladium 46	108 <b>Ag</b> Silver 47	112 <b>Cd</b> Cadmium 48	115 <b>In</b> Indium 49	119 <b>Sn</b> Tin 50	122 <b>Sb</b> Antimony 51	128 <b>Te</b> Tellurium 52	127 <b>I</b> Iodine 53	131 <b>Xe</b> Xenon 54		
133 <b>Cs</b> Caesium 55	137 <b>Ba</b> Barium 56	139 <b>La</b> Lanthanum 57	178 <b>Hf</b> Hafnium 72	181 <b>Ta</b> Tantalum 73	184 <b>W</b> Tungsten 74	186 <b>Re</b> Rhenium 75	190 <b>Os</b> Osmium 76	192 <b>Ir</b> Iridium 77	195 <b>Pt</b> Platinum 78	197 <b>Au</b> Gold 79	201 <b>Hg</b> Mercury 80	204 <b>Tl</b> Thallium 81	207 <b>Pb</b> Lead 82	209 <b>Bi</b> Bismuth 83	84 <b>Po</b> Polonium 84	85 <b>At</b> Astatine 85	86 <b>Rn</b> Radon 86
87 <b>Fr</b> Francium 87	226 <b>Ra</b> Radium 88											175 <b>Lu</b> Lutetium 71					
												169 <b>Tm</b> Thulium 69					
												167 <b>Er</b> Erbium 68					
												165 <b>Ho</b> Holmium 67					
												162 <b>Dy</b> Dysprosium 66					
												159 <b>Tb</b> Terbium 65					
												157 <b>Gd</b> Gadolinium 64					
												152 <b>Eu</b> Europium 63					
												150 <b>Sm</b> Samarium 62					
												144 <b>Nd</b> Neodymium 60					
												141 <b>Pr</b> Praseodymium 59					
												140 <b>Ce</b> Cerium 58					
												238 <b>U</b> Uranium 92					
												232 <b>Th</b> Thorium 90					
												94 <b>Pu</b> Plutonium 94					
												93 <b>Np</b> Neptunium 93					
												91 <b>Pa</b> Protactinium 91					
												96 <b>Cm</b> Curium 96					
												97 <b>Bk</b> Berkelium 97					
												98 <b>Cf</b> Californium 98					
												99 <b>Es</b> Einsteinium 99					
												100 <b>Fm</b> Fermium 100					
												101 <b>Md</b> Mendelevium 101					
												102 <b>No</b> Nobelium 102					
												103 <b>Lr</b> Lawrencium 103					

\*58-71 Lanthanoid series  
90-103 Actinoid series

Key

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

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