



UNIVERSITY OF CAMBRIDGE INTERNATIONAL EXAMINATIONS
General Certificate of Education Ordinary Level

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COMBINED SCIENCE

5129/01

Paper 1 Multiple Choice

May/June 2012

1 hour

Additional Materials: Multiple Choice Answer Sheet
Soft clean eraser
Soft pencil (type B or HB is recommended)

* 5 2 8 6 8 2 8 8 6 2 *

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.

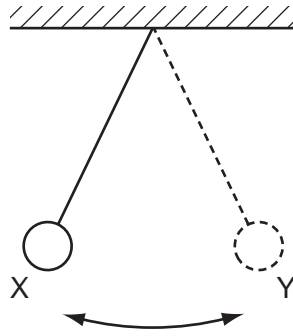
Any rough working should be done in this booklet.

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

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



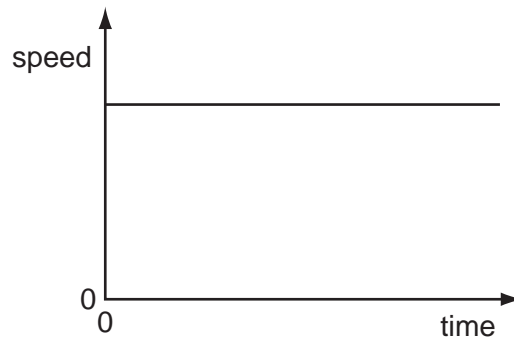
- 1 The bob of a simple pendulum is swinging between points X and Y.



It swings from X to Y and back to X again ten times in 8.65 s.

What is the period of the pendulum?

- A** 0.43 s **B** 0.87 s **C** 4.3 s **D** 86 s
- 2 The motion of an object is represented by a speed-time graph.



Which statement about this object is correct?

- A** It is at rest.
B It is moving at uniform speed.
C It is moving with increasing speed.
D It is moving with uniform acceleration.
- 3 Which expression can be used to calculate force?
- A** mass = force / acceleration
B mass = force \times acceleration
C power = force \times time
D work = force / distance

- 4 50 cm³ of a liquid has a mass of 40 g.

What is the density of the liquid?

- A 0.80 g/cm³ B 1.25 g/cm³ C 10 g/cm³ D 90 g/cm³

- 5 Four people run up the same steps.

Which person produces the largest power?

	weight of person / N	time taken / s
A	300	4
B	400	5
C	500	10
D	600	15

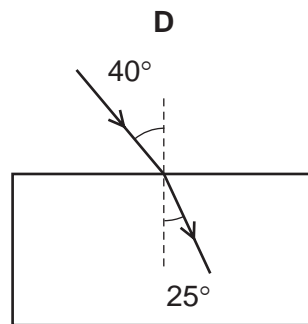
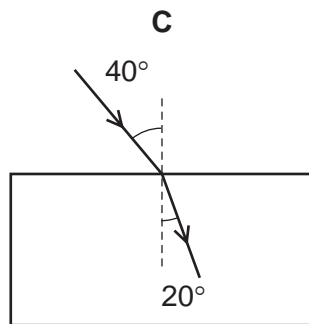
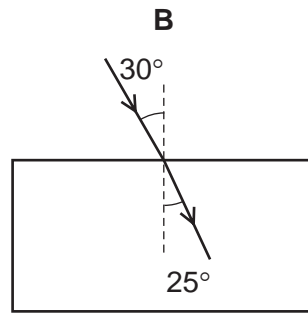
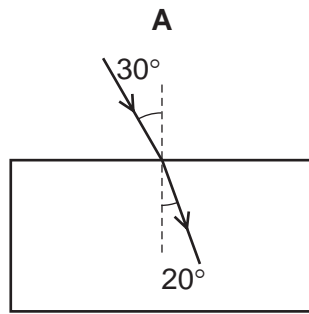
- 6 What makes a liquid-in-glass thermometer sensitive to a small change of temperature?

- A a bulb with a thin glass wall
B a shiny liquid in its bore
C a stem with a thick glass wall
D a very narrow bore

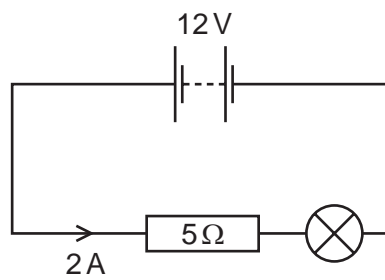
- 7 Which type of wave is longitudinal?

- A light wave
B radio wave
C sound wave
D surface water wave

8 Which block is made from a material with a refractive index of 1.52?



9 The diagram shows the value of various quantities in a circuit.

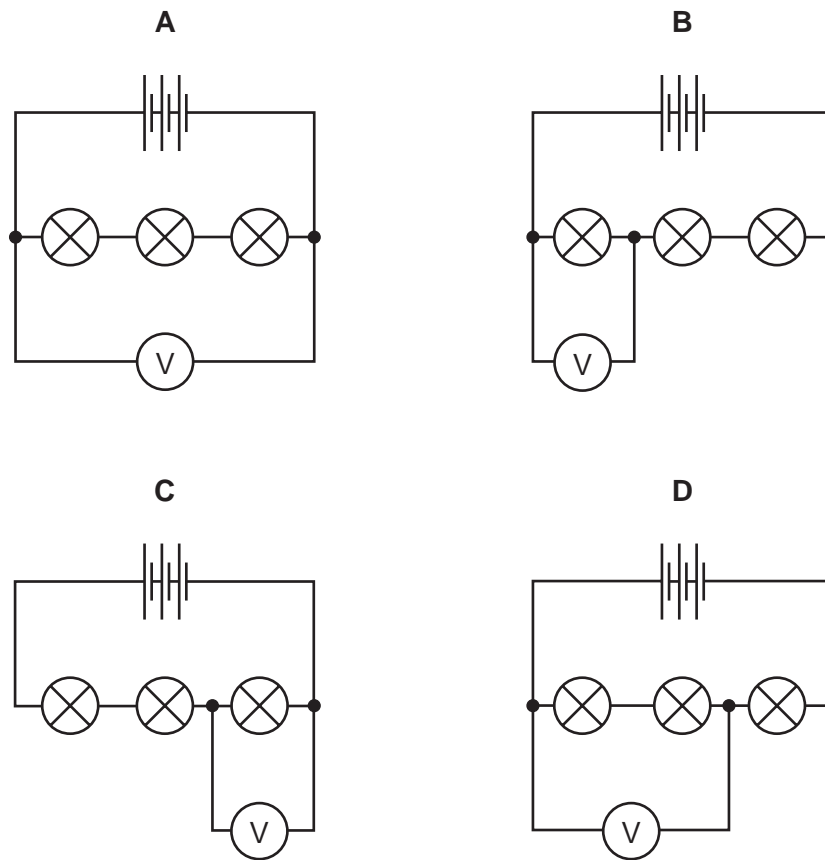


What is the potential difference across the resistor?

- A** 2V **B** 5V **C** 10V **D** 12V

- 10 Three identical cells and three identical lamps are connected in series. A voltmeter is connected.

In which arrangement will the voltmeter reading show the highest voltage?



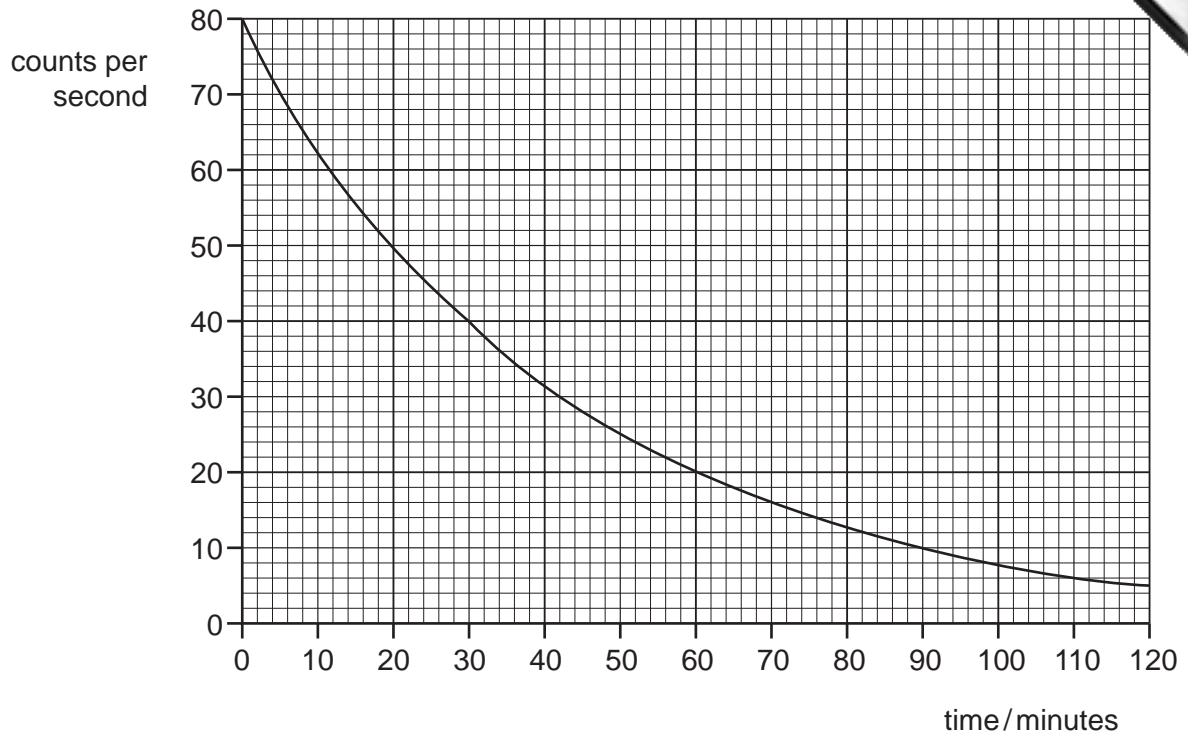
- 11 Which correctly describes the ease with which iron or steel can be magnetised and demagnetised?

- A iron is difficult to magnetise and easy to demagnetise
- B iron is easy to magnetise and difficult to demagnetise
- C steel is difficult to magnetise and difficult to demagnetise
- D steel is easy to magnetise and easy to demagnetise

- 12 What does the nucleus of an atom of carbon contain?

- A electrons and protons
- B electrons only
- C neutrons and protons
- D neutrons only

13 The graph shows how the count rate measured from a radioactive isotope changes with time.

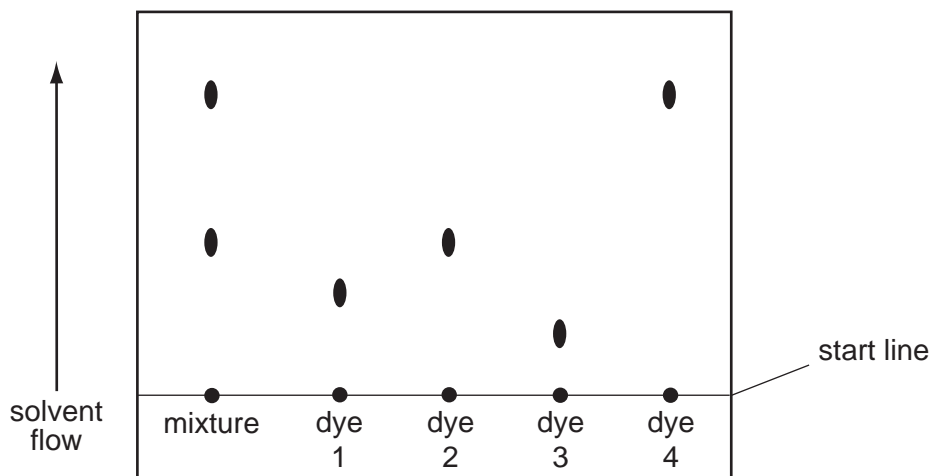


What is the half-life of this isotope?

- A 15 minutes
- B 30 minutes
- C 60 minutes
- D 90 minutes

14 A mixture of two dyes was compared with four other dyes using chromatography.

The results are shown in the diagram.



Which two dyes does the mixture contain?

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

15 Which row represents an ion with a charge of 2^{-} ?

	protons	neutrons	electrons
A	2	4	2
B	11	12	10
C	12	12	10
D	16	16	18

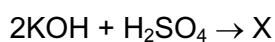
16 What is formed when an element X, proton number 19, reacts with an element Y, proton number 17?

- A** a covalent compound of formula XY
B a covalent of formula XY_2
C an ionic compound of formula XY
D an ionic compound of formula XY_2

17 Which pair of properties is typical of a covalent compound?

	melting point/°C	conductivity of aqueous solution
A	120	conducts
B	120	does not conduct
C	1610	conducts
D	1610	does not conduct

18 The following equation is incomplete.



What is represented by X?

- A** $\text{KSO}_4 + \text{H}_2\text{O}$
 - B** $\text{K}_2\text{SO}_4 + \text{H}_2\text{O}$
 - C** $\text{KSO}_4 + 2\text{H}_2\text{O}$
 - D** $\text{K}_2\text{SO}_4 + 2\text{H}_2\text{O}$
- 19 Which compound can form an aqueous solution with pH 14?
- A** carbon dioxide
 - B** hydrogen chloride
 - C** sodium chloride
 - D** sodium hydroxide

20 The table shows the proton number of four elements.

element	W	X	Y	Z
proton number	9	11	17	19

Which statement is correct?

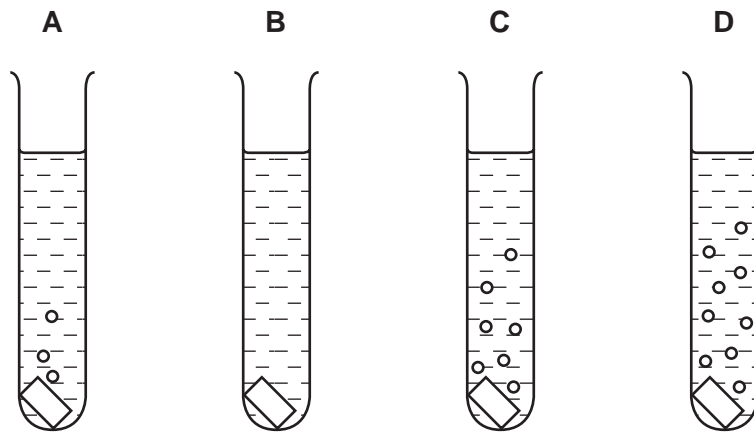
- A** W is a metal.
- B** W is more reactive than Y.
- C** X is more reactive than Z.
- D** Y and Z are in the same period.

21 Which row represents an alkali metal?

	melting point	conductivity of the solid	conductivity when molten
A	high	high	low
B	high	low	high
C	low	high	high
D	low	low	low

22 Pieces of copper, iron, magnesium and zinc are added to separate test-tubes containing dilute hydrochloric acid.

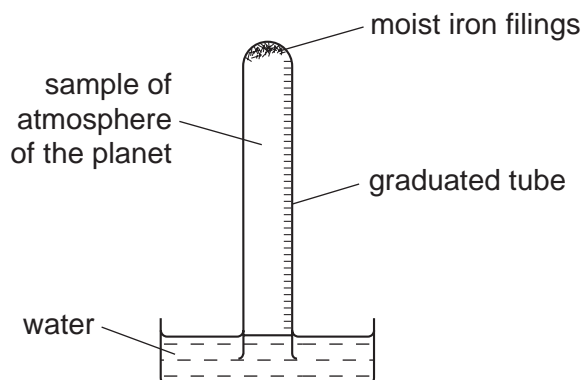
Which test-tube contains iron and dilute hydrochloric acid?



23 The atmosphere of a newly discovered planet contains the following gases.

carbon dioxide	20 %
nitrogen	40 %
noble gases	10 %
oxygen	30 %

A 100 cm^3 sample of the atmosphere of the planet was used in the apparatus below. The volume of the sample was measured at intervals until no further change in volume took place.



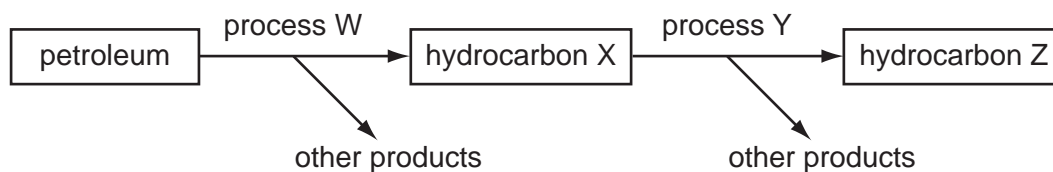
What volume of the sample of the atmosphere would remain?

- A** 10 cm^3 **B** 30 cm^3 **C** 40 cm^3 **D** 70 cm^3

24 Which row gives a correct use for the metal stated?

	metal	use
A	aluminium	manufacture of aircraft
B	copper	galvanising dustbins
C	mild steel	cutlery
D	zinc	cooking utensils

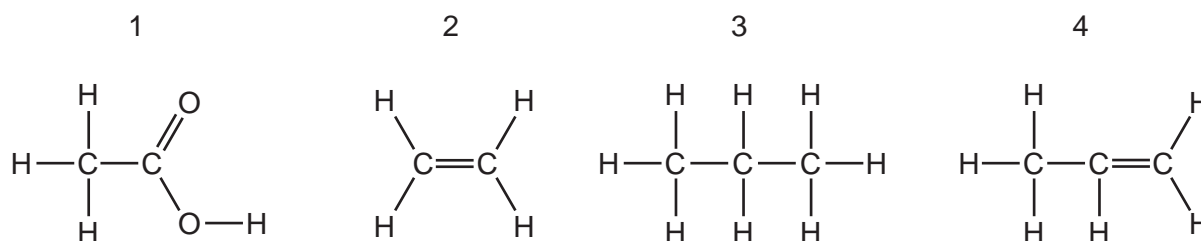
25 Hydrocarbon Z is obtained from petroleum by processes W and Y.



What are W, X, Y and Z?

	W	X	Y	Z
A	cracking	alkane	polymerisation	polyethene
B	cracking	alkene	cracking	alkane
C	fractional distillation	alkane	cracking	alkene
D	fractional distillation	alkene	polymerisation	polyethene

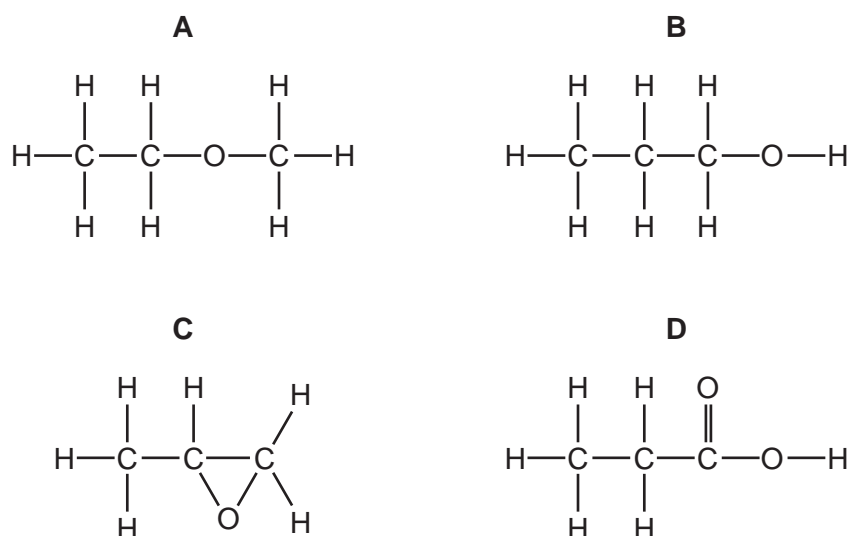
26 The structures of four organic compounds are shown.



Which compounds decolourise aqueous bromine?

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

27 Which structural formula represents an alcohol?



28 Which pair of statements explain why plant cells are more angular in shape than animal cells?

	plant cells	animal cells
A	one or more large vacuoles	small or no vacuoles
B	partially permeable cell membrane	fully permeable cell membrane
C	rigid cell wall	no cell wall
D	thin layer of cytoplasm	dense cytoplasm throughout cell

29 A human red blood cell is placed into a concentrated salt solution.

In which direction does water move and what is the effect on the cell?

	movement of water	effect on cell
A	into the cell	small increase in size
B	into the cell	cell bursts
C	out of the cell	small decrease in size
D	out of the cell	no change in cell volume

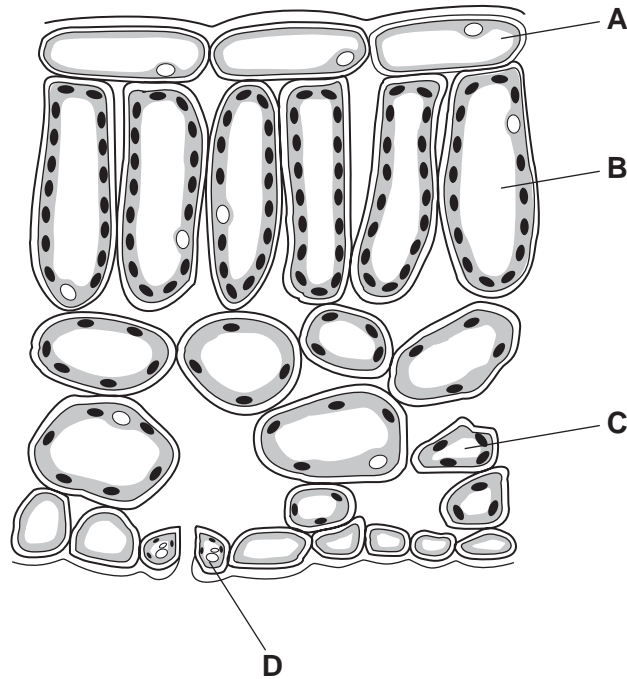
30 Four tubes containing 10 cm^3 of 1% starch solution were treated in different ways and then mixed with saliva. After 30 minutes, 1 cm^3 of iodine in potassium iodide solution was added to each tube.

In which tube did the contents remain a yellow-brown?

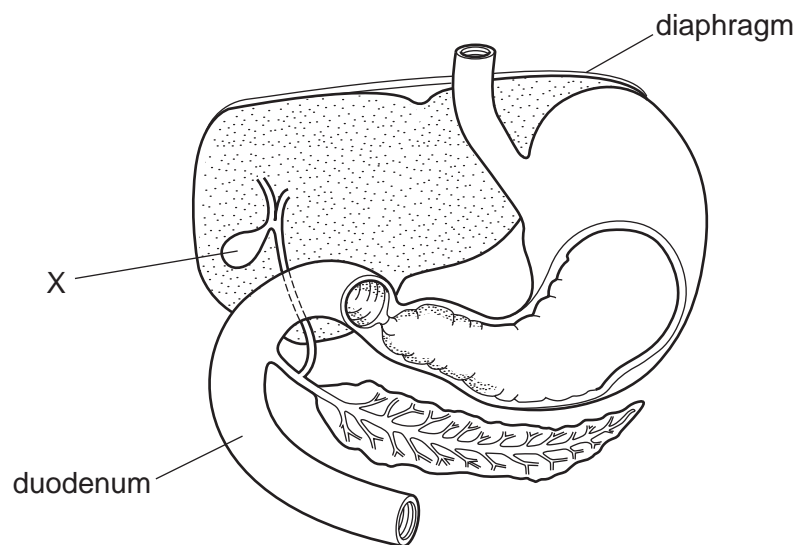
	temperature $^{\circ}\text{C}$	pH
A	35	2.5
B	35	6.9
C	75	2.5
D	75	6.9

31 The diagram shows the cross-section of part of a leaf.

In which cell does most photosynthesis take place?



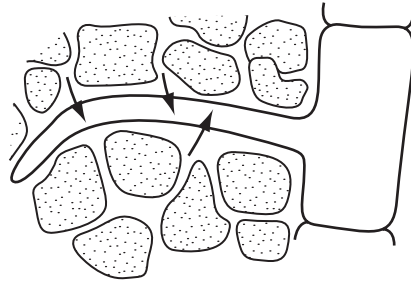
32 The diagram shows some organs in the human abdomen.



What is the function of X?

- A** to digest fats
- B** to make enzymes
- C** to store bile
- D** to store urine

- 33 The diagram shows a root hair that is absorbing ions from the surrounding soil.



What assists the uptake of ions by the root hair?

- A a high concentration of ions in the root hair
 - B a large surface area of the root hair
 - C a low temperature in the surrounding soil
 - D rapid uptake of water from the soil by osmosis
- 34 When blood is pumped out of the heart, which valves on the left side of the heart must be open and which must be closed?

	open	closed
A	bicuspid	semi-lunar
B	bicuspid	tricuspid
C	semi-lunar	bicuspid
D	semi-lunar	tricuspid

- 35 Which statement explains why, even when athletes have finished a race, they still carry on breathing more quickly and deeply than normal for several minutes?
- A to remove carbon dioxide produced during anaerobic respiration
 - B to remove urea produced by breakdown of amino acids
 - C to replace stored glycogen in muscles
 - D to take in extra oxygen to breakdown lactic acid
- 36 Which action causes rays of light from a near object to be focused on the retina?
- A ciliary muscles contract
 - B ciliary muscles relax
 - C circular iris muscles contract
 - D circular iris muscles relax

37 Which of these drugs can be both addictive and depressant?

	alcohol	heroin	
A	✓	✓	key
B	✓	x	✓ = yes
C	x	✓	x = no
D	x	x	

38 Which statement about food chains must be correct?

- A** Producers are the final stage in a food chain.
- B** There are more producers than consumers in a food chain.
- C** There is only one type of herbivore in a food chain.
- D** The third member of a food chain is a herbivore.

39 Which row shows the consequences of deforestation?

	makes soil less stable	increases natural biodiversity
A	✓	✓
B	✓	x
C	x	✓
D	x	x

40 Which method of contraception is most effective?

- A** hormonal
- B** mechanical
- C** natural
- D** surgical

DATA SHEET
The Periodic Table of the Elements

		Group																		
		I	II	III	IV	V	VI	VII	VIII	IX	X									
		1 H Hydrogen 1																		
7	9	Li Lithium 3	Be Beryllium 4									He Helium 2								
23	24	Na Sodium 11	Mg Magnesium 12									Ne Neon 10								
39	40	K Potassium 19	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	70 Ga Gallium 31	73 Ge Germanium 32	75 As Arsenic 33	79 Se Selenium 34	80 Br Bromine 35	84 Kr Krypton 36	
85	88	Rb Rubidium 37	Sr Strontium 38	89 Y Yttrium 39	91 Zr Zirconium 40	93 Nb Niobium 41	96 Mo Molybdenum 42	101 Ru Ruthenium 44	106 Pd Palladium 46	108 Ag Silver 47	112 Cd Cadmium 48	115 In Indium 49	119 Sn Tin 50	122 Sb Antimony 51	128 Te Tellurium 52	127 I Iodine 53	131 Xe Xenon 54			
133	137	Cs Caesium 55	Ba Barium 56	139 La Lanthanum 57	178 Hf Hafnium 72	181 Ta Tantalum 73	184 W Tungsten 74	190 Os Osmium 76	195 Pt Platinum 78	197 Au Gold 79	201 Hg Mercury 80	204 Tl Thallium 81	207 Pb Lead 82	209 Bi Bismuth 83	210 Po Polonium 84	210 At Astatine 85	210 Rn Radon 86			
	226	Fr Francium 87	Ra Radium 88	227 Ac Actinium 89																
													*58-71 Lanthanoid series		†90-103 Actinoid series					
		a		X		a = relative atomic mass		X = atomic symbol		b = proton (atomic) number										
		b		X		b = proton (atomic) number		X = atomic symbol		a = relative atomic mass										
		140 Ce Cerium 58	141 Pr Praseodymium 59	144 Nd Neodymium 60	144 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	232 Pa Protactinium 91	238 U Uranium 92	238 Np Neptunium 93	238 Pu Plutonium 94	238 Am Americium 95	238 Cm Curium 96	238 Bk Berkelium 97	238 Cf Californium 98	238 Es Einsteinium 99	238 Fm Fermium 100	238 Md Mendelevium 101	238 No Nobelium 102	238 Lr Lawrencium 103					

The volume of one mole of any gas is 24 dm³ at room temperature and pressure (r.t.p.).