



UNIVERSITY OF CAMBRIDGE INTERNATIONAL EXAMINATIONS
General Certificate of Education Ordinary Level

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)



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.

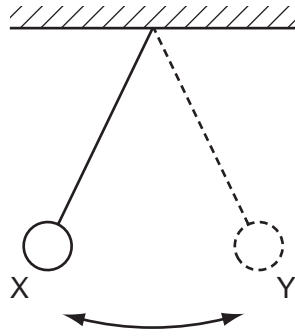
Any rough working should be done in this booklet.

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

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



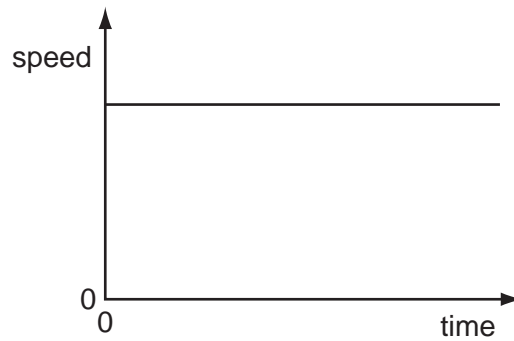
- 1 The bob of a simple pendulum is swinging between points X and Y.



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 |

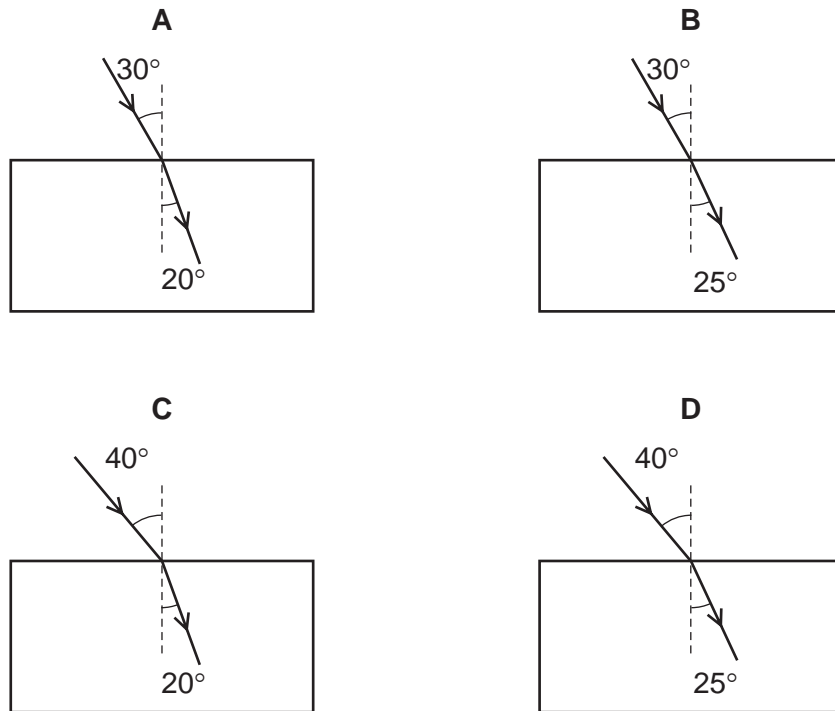
- 6 What makes a liquid-in-glass thermometer sensitive to a small change of temperature?

- 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

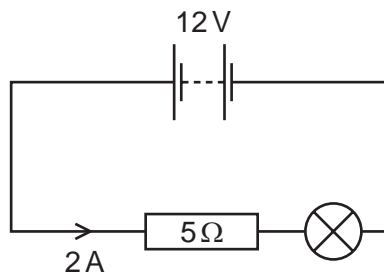
- 7 Which type of wave is longitudinal?

- 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.

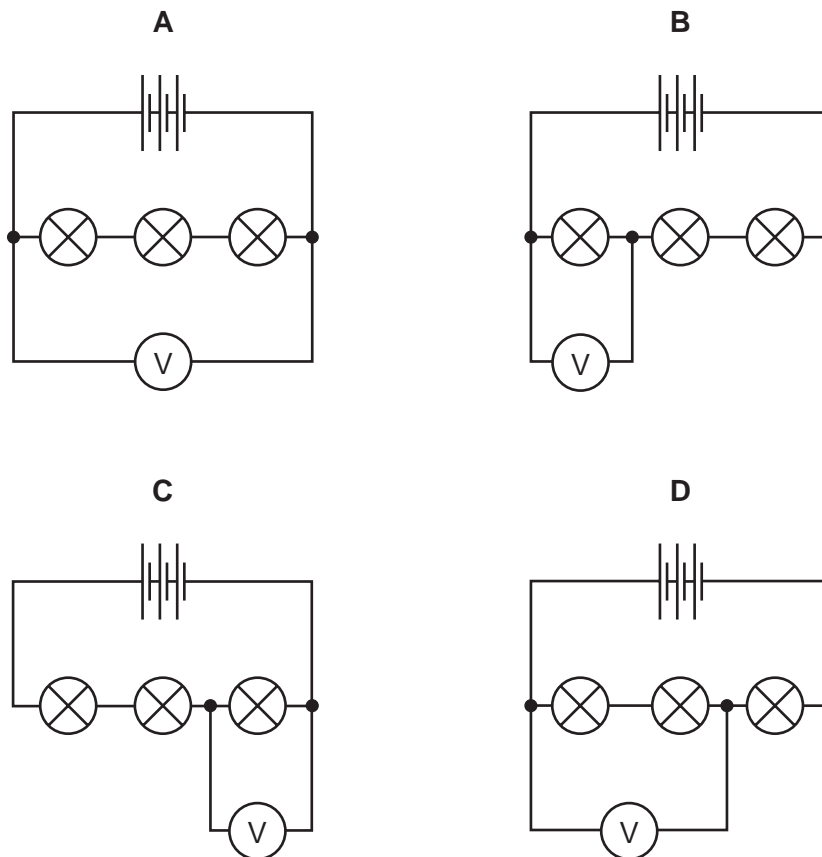


What is the potential difference across the resistor?

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

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

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



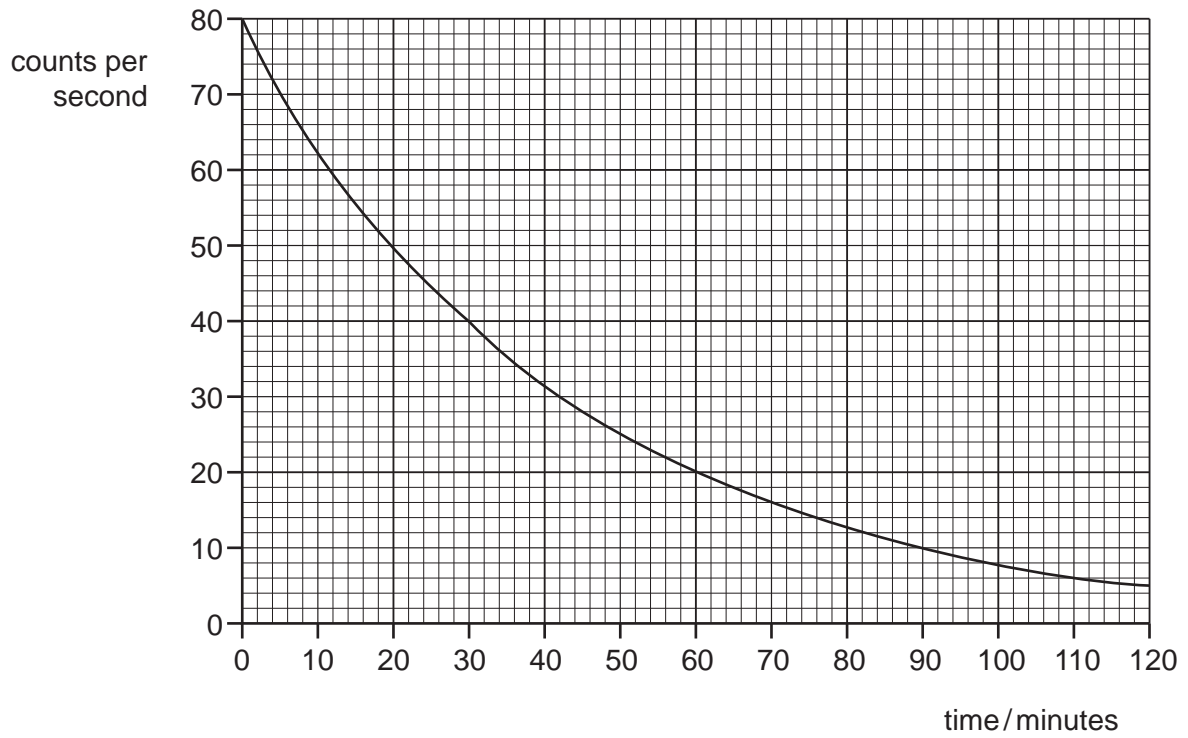
- 11 Which correctly describes the ease with which iron or steel can be magnetised and demagnetised?

- 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.

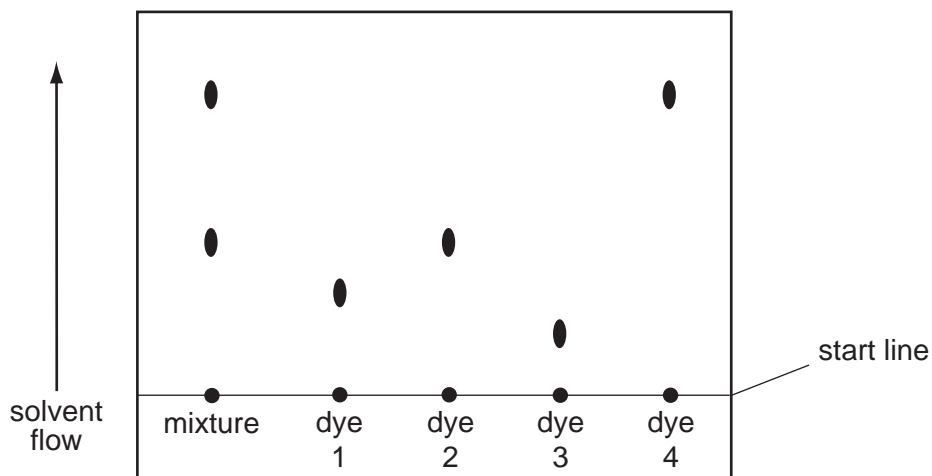


What is the half-life of this isotope?

- 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 |

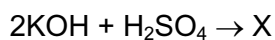
16 What is formed when an element X, proton number 19, reacts with an element Y, proton number 17?

- 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?

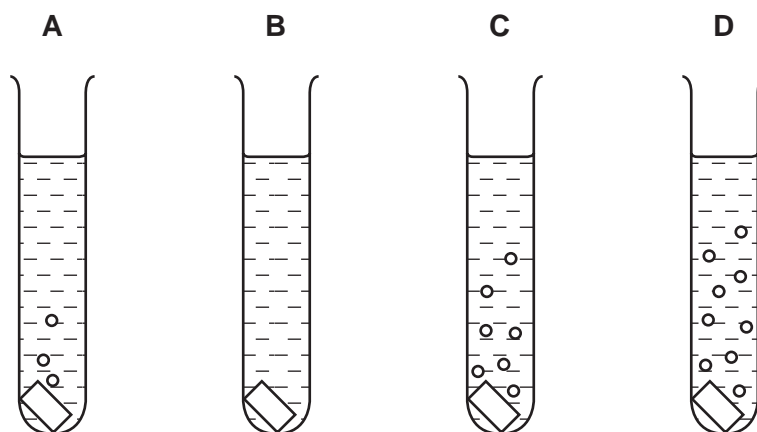
- A** W is a metal.
- B** W is more reactive than Y.
- C** X is more reactive than Z.
- D** Y and Z are in the same period.

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.

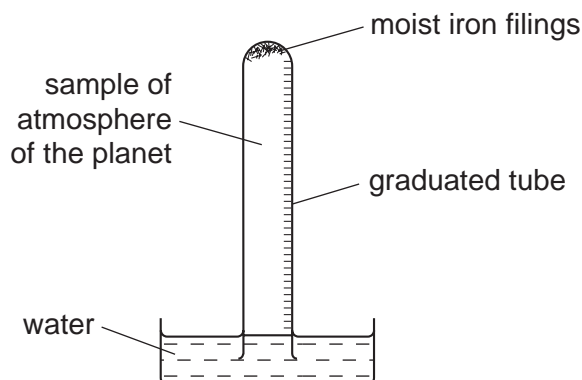
Which test-tube contains iron and dilute hydrochloric acid?



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.



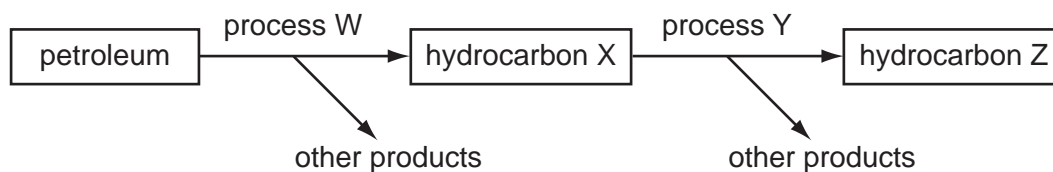
What volume of the sample of the atmosphere would remain?

- 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 |

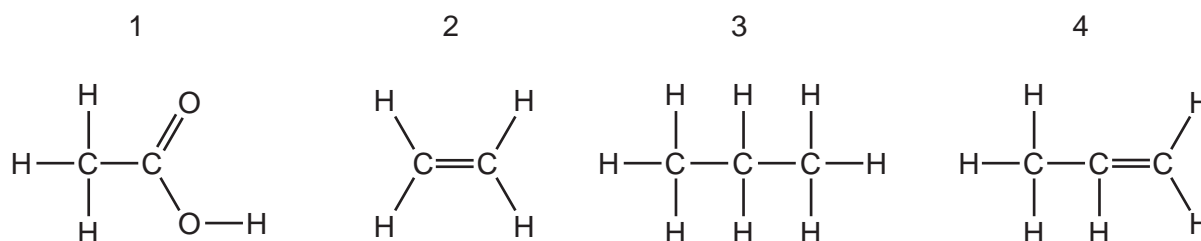
25 Hydrocarbon Z is obtained from petroleum by processes W and Y.



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 |

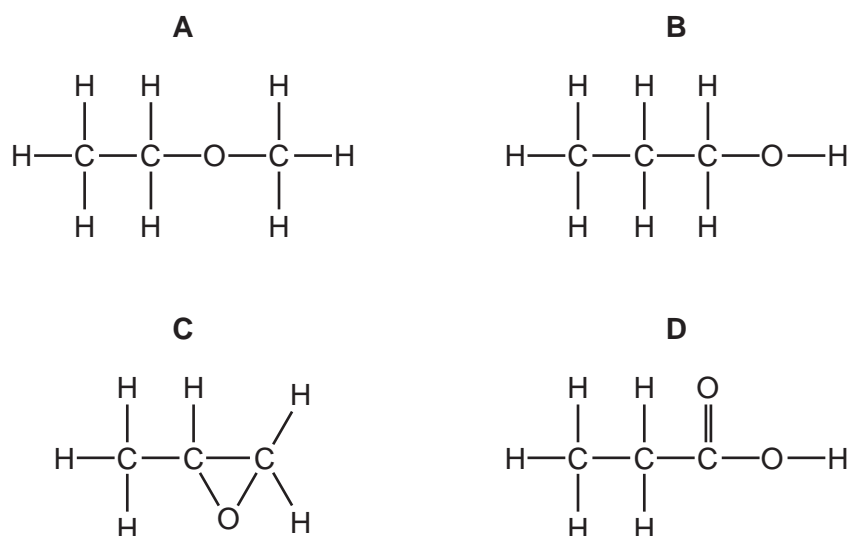
26 The structures of four organic compounds are shown.



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 |

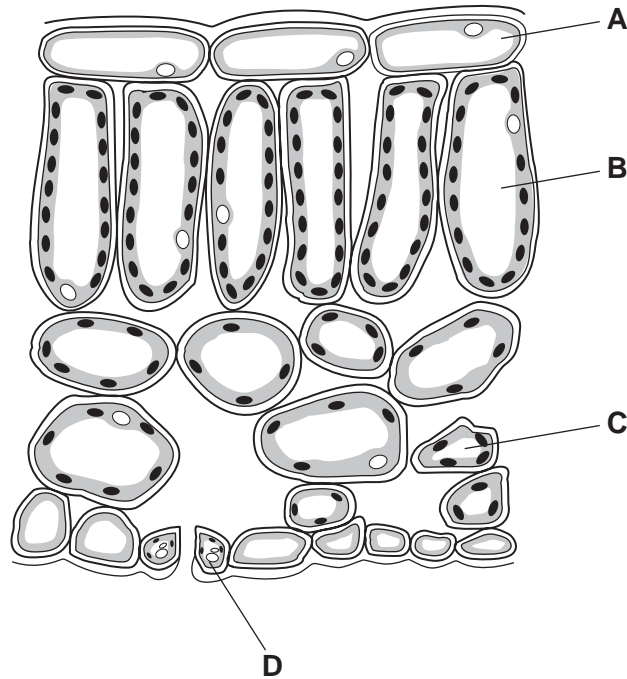
30 Four tubes containing 10 cm³ of 1 % starch solution were treated in different ways and then mixed with saliva. After 30 minutes, 1 cm³ of iodine in potassium iodide solution was added to each tube.

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

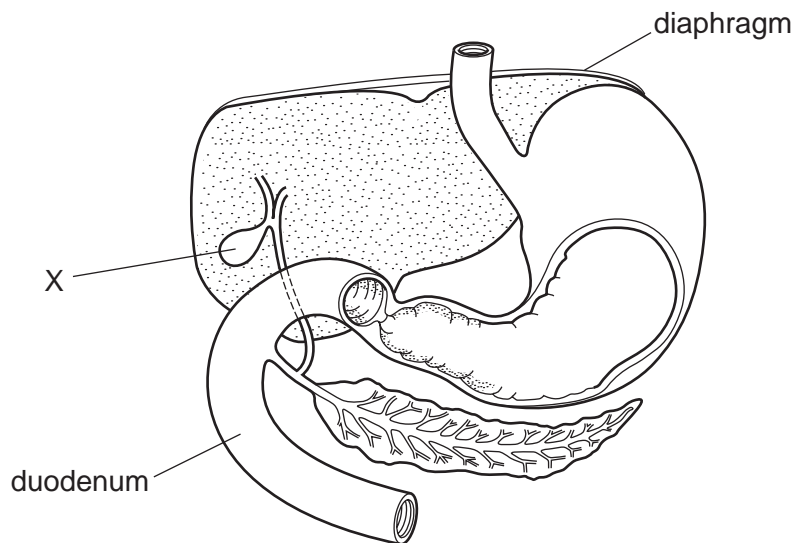
| | temperature °C | pH |
|----------|----------------|-----|
| A | 35 | 2.5 |
| B | 35 | 6.9 |
| C | 75 | 2.5 |
| D | 75 | 6.9 |

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

In which cell does most photosynthesis take place?



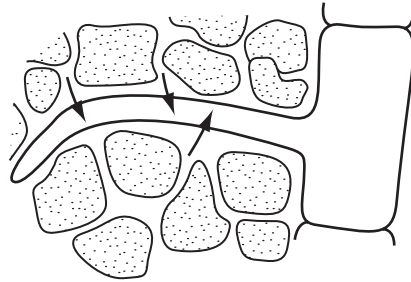
32 The diagram shows some organs in the human abdomen.



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 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | 1 H Hydrogen 1 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 7 | 9 | Li Lithium 3 | Be Beryllium 4 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 23 | 24 | Na Sodium 11 | Mg Magnesium 12 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 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 | 101 Rh Rhodium 45 | 106 Pd Palladium 46 | 108 Ag Silver 47 | 112 Cd Cadmium 48 | 115 In Indium 49 | 115 Sn Tin 50 | 119 Sb Antimony 51 | 122 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 | 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 | 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 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | 140 Ce Cerium 58 | | | | | | | | | | 141 Pr Praseodymium 59 | | | | | | | | | | 144 Nd Neodymium 60 | | | | | | | | | | 150 Sm Samarium 62 | | | | | | | | | | 152 Eu Europium 63 | | | | | | | | | | 157 Gd Gadolinium 64 | | | | | | | | | | 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 | | | | | | | | | | 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.).

| | | | |
|-----|--------------------------|-------------------|----------------------------|
| | a | X | b |
| Key | a = relative atomic mass | X = atomic symbol | b = proton (atomic) number |

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