



UNIVERSITY OF CAMBRIDGE INTERNATIONAL EXAMINATIONS
General Certificate of Education Ordinary Level

SCIENCE (PHYSICS, CHEMISTRY)

5124/01

Paper 1 Multiple Choice

October/November 2007

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.

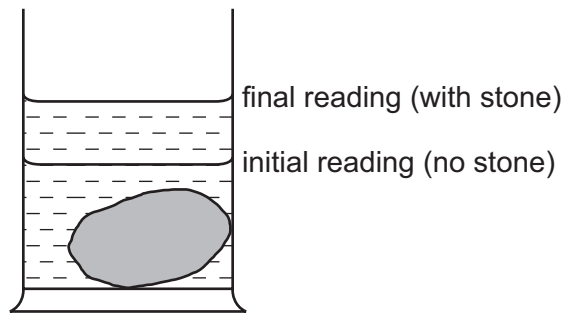
Any rough working should be done in this booklet.

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

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



- 1 As part of an experiment to find the density of stone, a stone is lowered into a measuring cylinder partly filled with water.



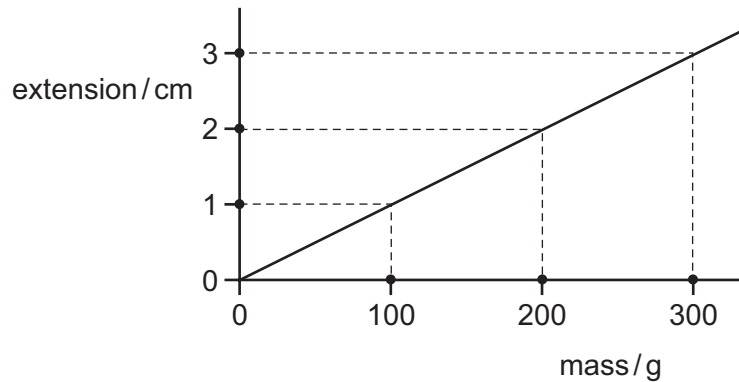
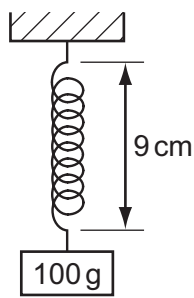
Which information can be obtained from the measuring cylinder readings?

- A The difference between the readings gives the density of stone.
 - B The difference between the readings gives the volume of the stone.
 - C The final reading gives the density of stone.
 - D The final reading gives the volume of the stone.
- 2 When his parachute is fully opened, a parachutist falls towards the ground at a constant speed.
- Under these conditions, which statement is correct?
- A There are no forces acting on the parachutist.
 - B The upward force on the parachute is greater than the weight of the parachutist.
 - C The upward force on the parachute is equal to the weight of the parachutist.
 - D The upward force on the parachute is less than the weight of the parachutist.
- 3 A sledge of mass 25 kg is pulled across level ground with a horizontal force of 60 N. The constant force of friction is 20 N.

What is the acceleration of the sledge?

- A 0.63 m/s^2 B 1.6 m/s^2 C 2.4 m/s^2 D 3.2 m/s^2

- 4 The diagrams show a spring having a length of 9 cm when loaded with a 100 g mass, and the extension-mass graph for the spring.



What is the length of the spring after the 100 g mass has been removed?

- A** 7 cm **B** 8 cm **C** 9 cm **D** 10 cm
- 5 Which type of energy is converted to thermal energy when atoms combine?

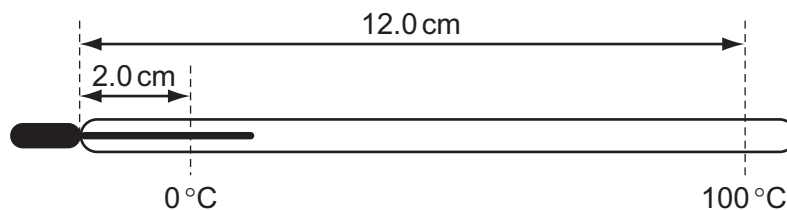
- A** chemical
B kinetic
C nuclear
D solar

- 6 A solid metal bar is heated at one end.

How is the thermal energy transferred to the other end of the bar?

- A** The heated molecules move along the bar, carrying all their energy to the other end.
B The heated molecules move along the bar, giving energy to other molecules as they pass.
C The heated molecules stay completely still but pass on their energy to other molecules.
D The heated molecules vibrate more rapidly and pass on energy to other molecules.

- 7 In a liquid-in-glass thermometer, the liquid column is 2.0 cm long at 0 °C and 12.0 cm long at 100 °C.



How long will the liquid column be at 30 °C?

- A** 2.3 cm **B** 3.0 cm **C** 5.0 cm **D** 9.0 cm

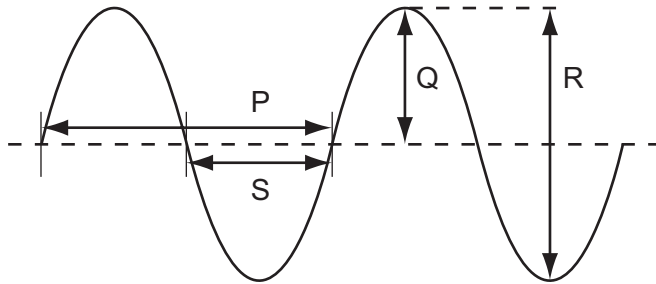
- 8 Equal volumes of four substances are heated at atmospheric pressure.

The temperature rise is the same for each substance.

Which substance expands the most?

- A air
- B mercury
- C steel
- D water

- 9 The diagram shows the surface of the water as a wave passes across a ripple tank.



Which lengths represent the amplitude and wavelength?

	amplitude	wavelength
A	Q	P
B	Q	S
C	R	P
D	R	S

- 10 A wave has a frequency of 10^4 Hz.

What are the possible values of its velocity and wavelength?

	velocity in m/s	wavelength in m
A	330	0.33
B	330	33
C	3×10^8	30
D	3×10^8	3×10^4

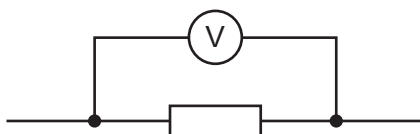
- 11 Which type of electromagnetic radiation travels at the highest speed through a vacuum?
- A gamma rays
 B light waves
 C radio waves
 D none – all have the same speed

- 12 A lightning flash carries 25 C of charge and lasts for 0.01 s.

What is the current?

- A 0.0004 A B 0.25 A C 25 A D 2500 A

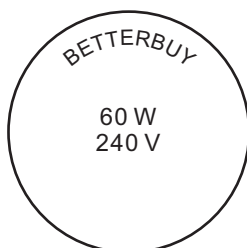
- 13 A voltmeter is connected across a resistor in an electrical circuit.



What does the reading on the voltmeter measure?

- A the work done in driving 1 A of current through the resistor
 B the work done in driving 1 C of charge through the resistor
 C the work done in driving 1 J of energy through the resistor
 D the work done in driving 1 W of power through the resistor
- 14 A $1.0\ \Omega$ resistor and a $2.0\ \Omega$ resistor are connected in series across a 12 V d.c. supply.
- What is the current in the circuit?
- A 12 A B 6.0 A C 4.0 A D 0.25 A

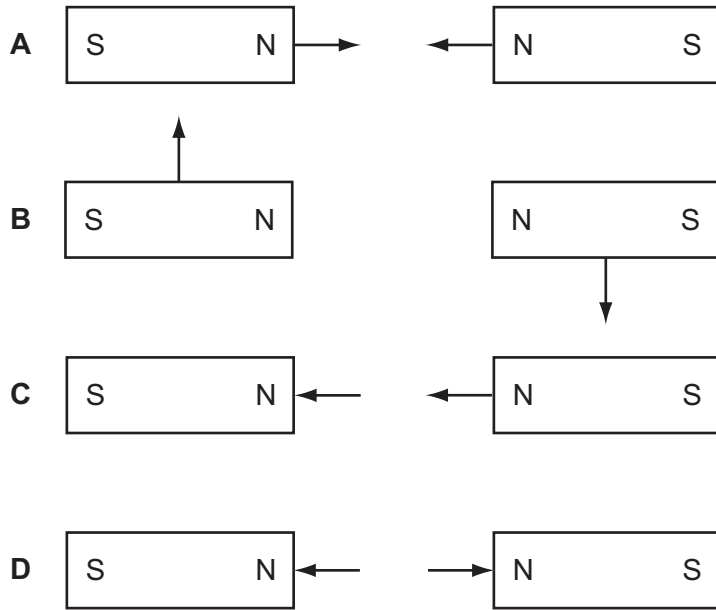
- 15 The diagram shows some information printed on a light bulb.



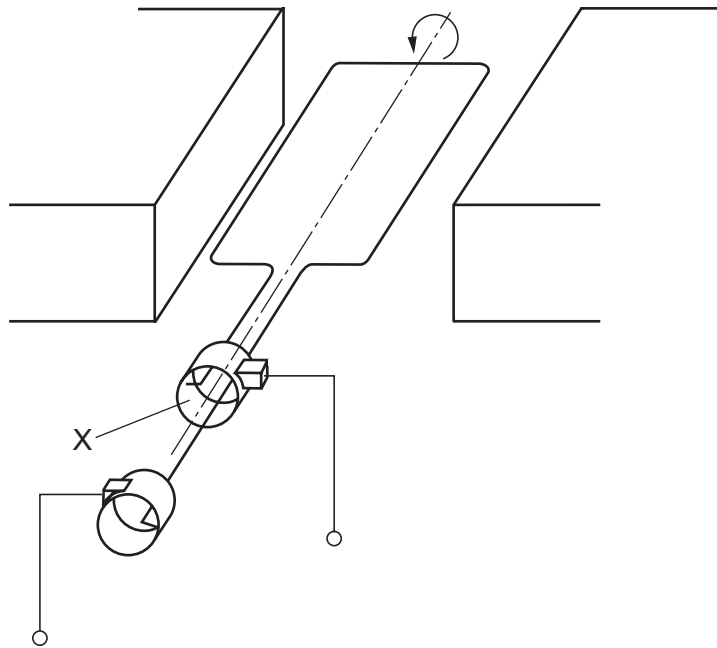
Which current is needed to light the bulb at normal brightness?

- A 0.25 A B 3.0 A C 4.0 A D 15 A

16 Which diagram shows the correct directions of the magnetic forces on two bar magnets?



17 The diagram shows a simple a.c. generator.



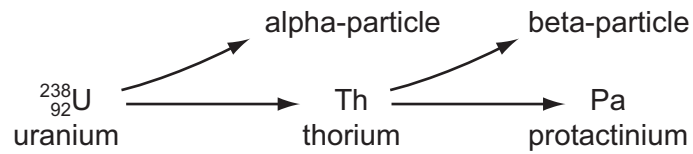
Which name is given to part X?

- A axle
- B carbon brush
- C magnet
- D slip ring

18 How many protons, neutrons and electrons are present in a neutral atom of sodium ${}_{11}^{23}\text{Na}$?

	protons	neutrons	electrons
A	11	12	11
B	11	23	11
C	12	11	12
D	12	23	12

19 The uranium atom ${}_{92}^{238}\text{U}$ emits an alpha-particle to become thorium, which then emits a beta-particle to become protactinium.

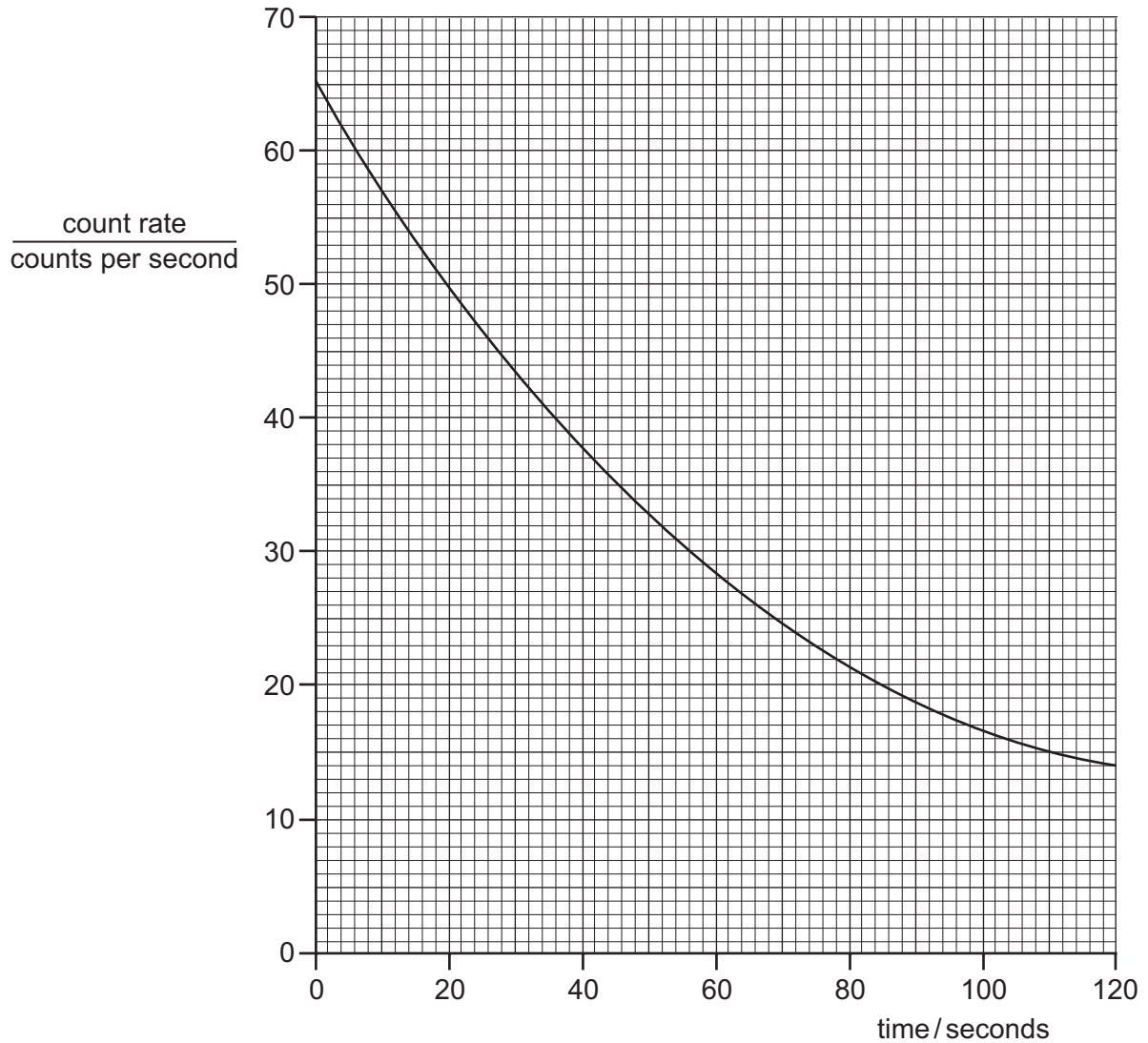


What is the proton number (atomic number) of protactinium?

- A** 89 **B** 90 **C** 91 **D** 95

- 20 Ra decays with a half-life of 1600 s.
 Rn decays with a half-life of 52 s.
 Po decays with a half-life of 9.1 s.
 Pb decays with a half-life of 10.6 h.

The changing count rate for one of these radioactive nuclides is shown in the graph.



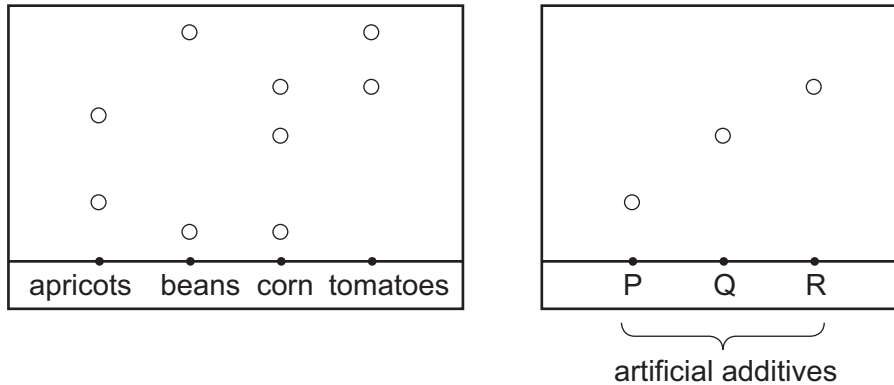
From the half-life shown by the graph, which was the decaying radioactive nuclide?

- A** Ra **B** Rn **C** Po **D** Pb

- 21 Samples of tinned apricots, beans, corn and tomatoes are tested for additives by using chromatography.

The chromatograms are compared with those of three artificial additives, P, Q and R.

The results are as follows.



Which tinned food does **not** contain any artificial additives?

- A apricots
 - B beans
 - C corn
 - D tomatoes
- 22 A substance is in a state in which its particles are widely spaced and able to move freely.

It changes to a state in which its particles are in contact but still able to move freely.

What is this change called?

- A condensation
 - B diffusion
 - C evaporation
 - D freezing
- 23 Element X has proton number 8 and nucleon number 18.

Which particles are present in the X^{2-} ion?

- A 10 electrons, 8 protons, 8 neutrons
- B 10 electrons, 8 protons, 10 neutrons
- C 10 electrons, 9 protons, 9 neutrons
- D 8 electrons, 8 protons, 18 neutrons

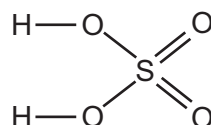
24 The table gives the electronic structure of four elements.

element	electronic structure
W	2.7
X	2.8.5
Y	2.8.6
Z	2.8.8.2

Which two elements form an ionic compound?

- A** W and X **B** W and Y **C** W and Z **D** X and Y

25 A molecule of sulphuric acid has the structural formula shown.



How many electrons are involved in forming all the covalent bonds in one molecule?

- A** 6 **B** 8 **C** 12 **D** 16

26 The formula of copper(I) oxide is Cu_2O .

How many grams of oxygen are combined with 64 g of copper in this compound?

- A** 8 **B** 16 **C** 32 **D** 64

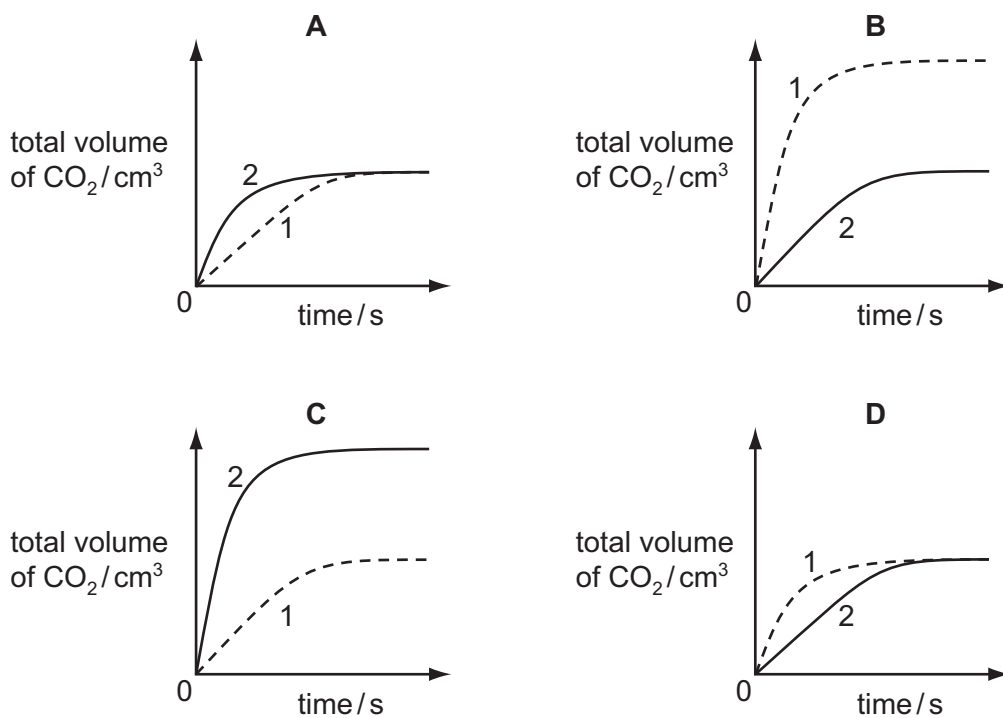
27 Which gas is always produced during photosynthesis?

- A** carbon dioxide
B methane
C oxygen
D water vapour

- 28 In two separate experiments, the reaction of powdered calcium carbonate with an excess of dilute hydrochloric acid is investigated.

The powder used in experiment 1 is finer than that used in experiment 2. All other conditions are identical in both experiments.

Which graph shows the results?



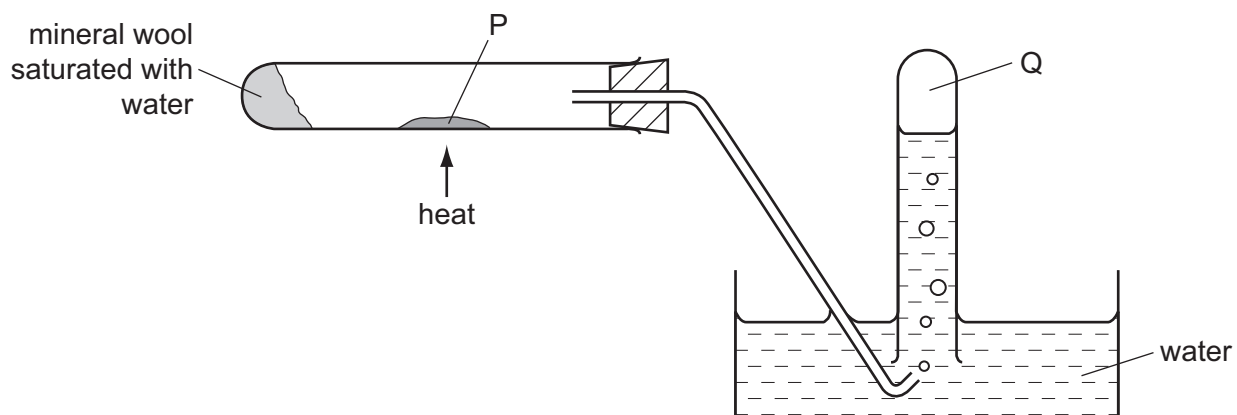
- 29 Which type of reaction takes place when H⁺ ions and OH⁻ ions react to form water?

- A condensation
- B ionisation
- C neutralisation
- D precipitation

- 30 Which statement about the alkali metals is correct?

- A Their melting points decrease on descending the group.
- B Their reactivities decrease on descending the group.
- C They form covalent bonds with the halogens.
- D They form oxides on reacting with water.

- 31 In the experiment shown in the diagram, steam is passed over a heated solid P. Gas Q is collected.

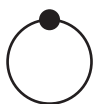


What are substances P and Q?

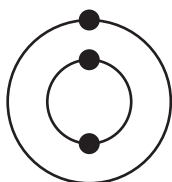
	P	Q
A	copper	hydrogen
B	lead	oxygen
C	silver	oxygen
D	zinc	hydrogen

- 32 The diagrams show the electronic structures of four elements.

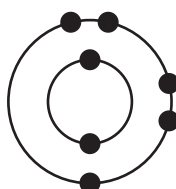
element 1



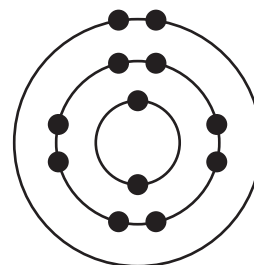
element 2



element 3



element 4



Which two elements are metals?

- A** 1 and 2 **B** 1 and 3 **C** 2 and 4 **D** 3 and 4
- 33 Which substance is added to a blast furnace to remove impurities from iron ore?

- A** carbon
B limestone
C sand
D slag

34 Which pollutant is correctly linked to its source?

	pollutant	source
A	carbon monoxide	internal combustion engine
B	methane	volcanoes
C	nitrogen oxide	bacterial decay
D	sulphur dioxide	lightning activity

35 Which gas is used to convert vegetable oils into margarine?

- A** carbon dioxide
- B** hydrogen
- C** nitrogen
- D** oxygen

36 Which statement about the manufacture of ammonia by the Haber Process is correct?

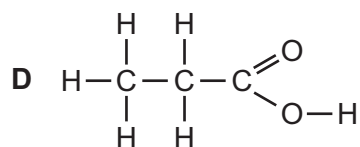
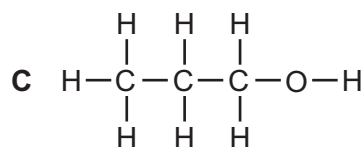
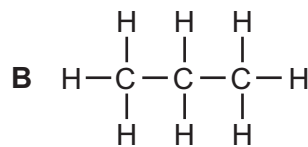
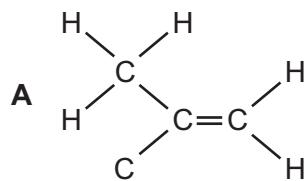
- A** The reactants and product are compounds.
- B** The reactants and product are elements.
- C** The reactants and product are gases.
- D** The reactants are both obtained from the air.

37 Bitumen is obtained from crude oil.

What is it used for?

- A** as fuel for aircraft
- B** as fuel for oil stoves
- C** for making polishes
- D** for making roads

38 Which compound decolourises aqueous bromine?



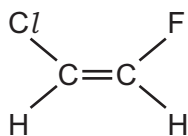
39 Compound X has the molecular formula C_2H_6O .

- X can be made by a fermentation process.
- X can be oxidised to Y.
- X can react with Y to form Z and water.

To which homologous series do X, Y and Z belong?

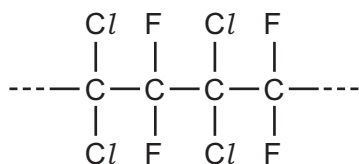
	X	Y	Z
A	alcohols	carboxylic acids	esters
B	alcohols	esters	carboxylic acids
C	carboxylic acids	alcohols	esters
D	carboxylic acids	esters	alcohols

40 The diagram shows the structure of a monomer.

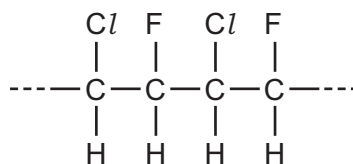


Which polymer is made from this monomer?

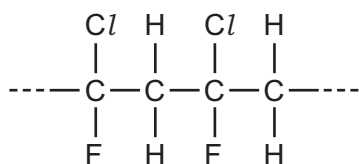
A



B



C



D

