UNIVERSITY OF CAMBRIDGE INTERNATIONAL EXAMINATIONS
International General Certificate of Secondary Education

CHEMISTRY **0620/01**

Paper 1 Multiple Choice

October/November 2005

45 minutes

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.

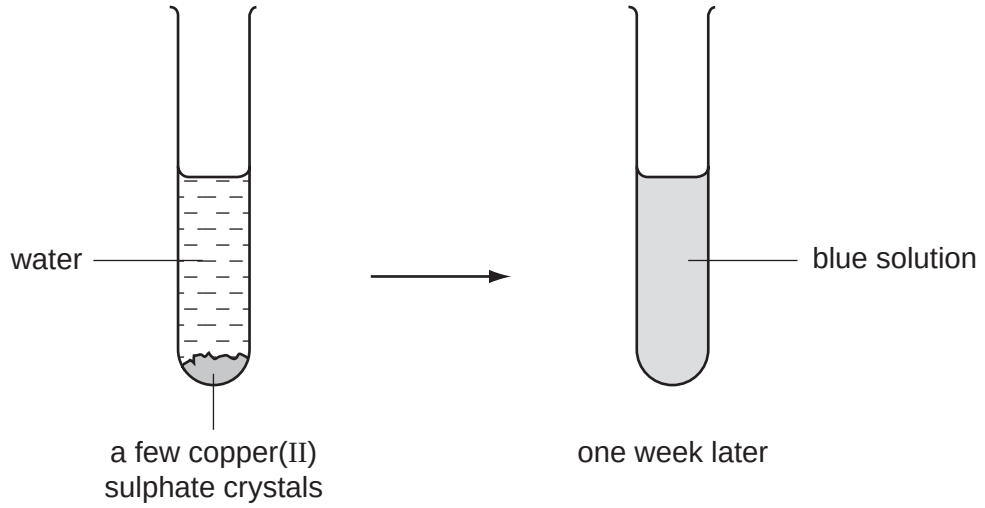
Read the instructions on the answer sheet very carefully.

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.
You may use a calculator.

IB05 11_0620_01/2RP

UNIVERSITY of CAMBRIDGE International Examinations

1 Blue copper(II) sulphate crystals are soluble in water.



What has happened after one week?

A crystallisation

B diffusion

C distillation

D filtration

2 The reaction between solution **P** and solution **Q** is exothermic.

A student is told to test this statement by mixing equal volumes of the two solutions and measuring the temperature change.

Which two pieces of apparatus should the student use?

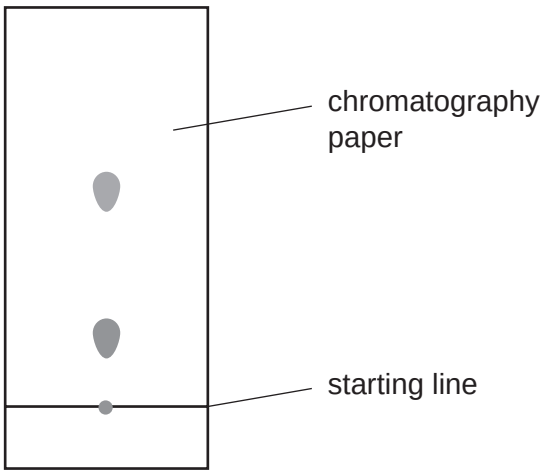
A balance and clock

B balance and thermometer

C pipette and clock

D pipette and thermometer

3 A coin is dissolved in an acid. Chromatography is used to test the solution formed. The diagram shows the chromatogram obtained.



What is the coin made from?

A a metal element

B a non-metal element

C a mixture of metals

D a mixture of non-metals

4 What do the nuclei in hydrogen molecules contain?

A electrons and neutrons

B electrons and protons

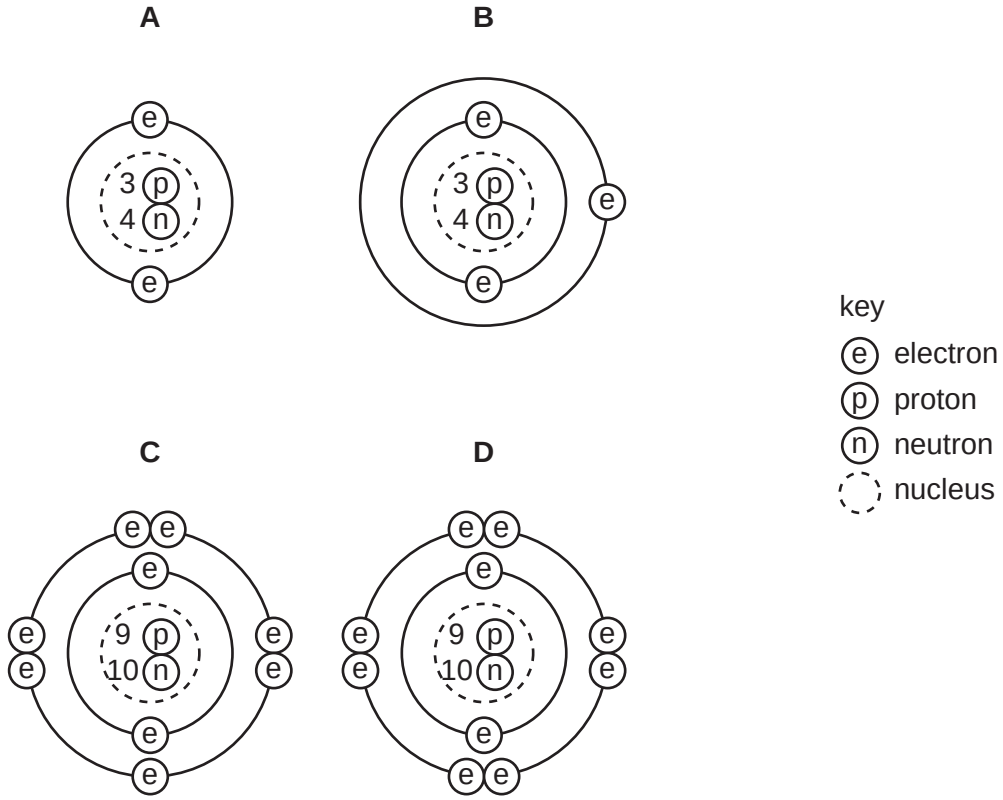
C neutrons only

D protons only

5 Which statements about isotopic atoms of the same element are correct?

	different number of electrons	different number of neutrons
A	✓	✓
B	✓	✗
C	✗	✓
D	✗	✗

6 Which diagram shows a positively charged ion?



7 Bottles of sodium hydroxide, sodium chloride and sugar have lost their labels.

Students test a sample from each bottle. Their results are shown in the table.

bottle	addition of water	conductivity of solution
1	forms an alkaline solution	conducts electricity
2	forms a neutral solution	conducts electricity
3	forms a neutral solution	does not conduct electricity

What are the correct labels for each bottle?

	bottle 1	bottle 2	bottle 3
A	sodium hydroxide	sodium chloride	sugar
B	sodium hydroxide	sugar	sodium chloride
C	sodium chloride	sugar	sodium hydroxide
D	sugar	sodium hydroxide	sodium chloride

8 The diagram shows the structure of hydrogen peroxide.

H—O—O—H

What is the total number of electrons used for bonding in this molecule?

A 3 **B** 4 **C** 6 **D** 8

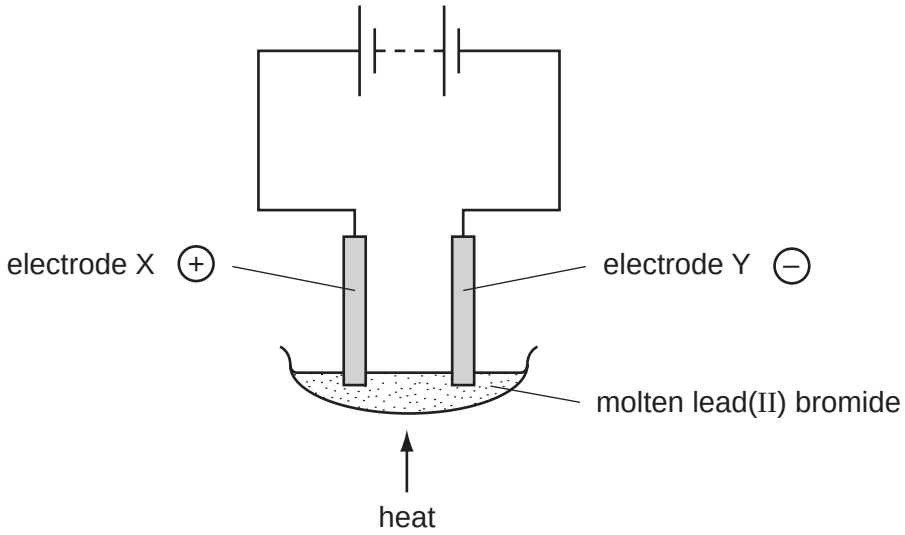
9 The equation shows the reaction that occurs when ethanol burns in air.

$$C_2H_5OH + x\,O_2 \longrightarrow y\,CO_2 + z\,H_2O$$

Which values of x, y and z are needed to balance this equation?

	x	y	z
A	2	2	2
B	2	2	3
C	2	3	3
D	3	2	3

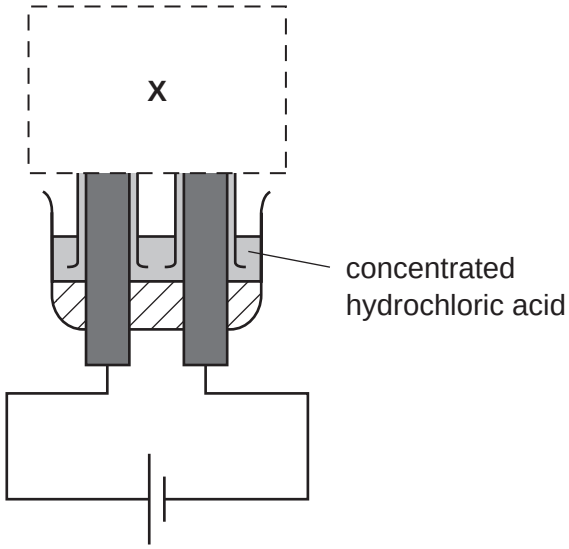
10 The diagram shows the electrolysis of molten lead(II) bromide.



What is seen at each electrode?

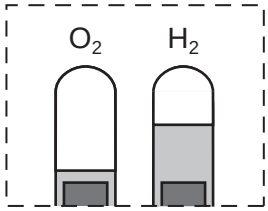
	electrode X	electrode Y
A	brown gas	silvery metal
B	brown metal	green gas
C	green gas	brown metal
D	silvery metal	brown gas

11 The diagram shown is not complete.

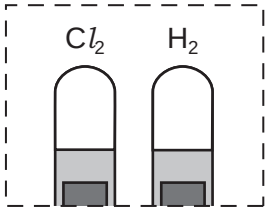


What should be shown at **X** when the solution has been electrolysed for some time?

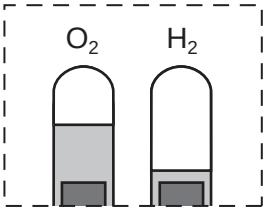
A



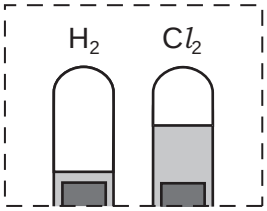
B



C



D



12 Which process is endothermic?

A burning hydrogen to form water

B condensing steam to water

C melting ice to form water

D reacting sodium with water

13 The elements H_2 and ^{235}U are both used as fuels.

In these processes, the reactions are …..1….. and …..2….. oxidised.

Which words correctly complete gaps 1 and 2?

	1	2
A	endothermic	both elements are
B	endothermic	only hydrogen is
C	exothermic	both elements are
D	exothermic	only hydrogen is

14 Why does the powdering of calcium carbonate increase the speed of its reaction with an acid?

A It increases the mass of calcium carbonate.

B It increases the surface area of the calcium carbonate.

C The powder becomes more concentrated.

D The powder floats on top of the acid.

15 Which process does **not** involve either oxidation or reduction?

A burning methane in the air

B extracting iron from hematite

C heating copper(II) oxide with carbon

D reacting sodium carbonate with dilute hydrochloric acid

16 An excess of acid in the stomach causes indigestion that can be cured by an anti-indigestion tablet.

What should the tablet contain to decrease the acidity?

A an acidic substance

B an alkaline substance

C a neutral substance

D Universal Indicator

17 A solution is made by adding sodium oxide to water.

Which pH change can occur?

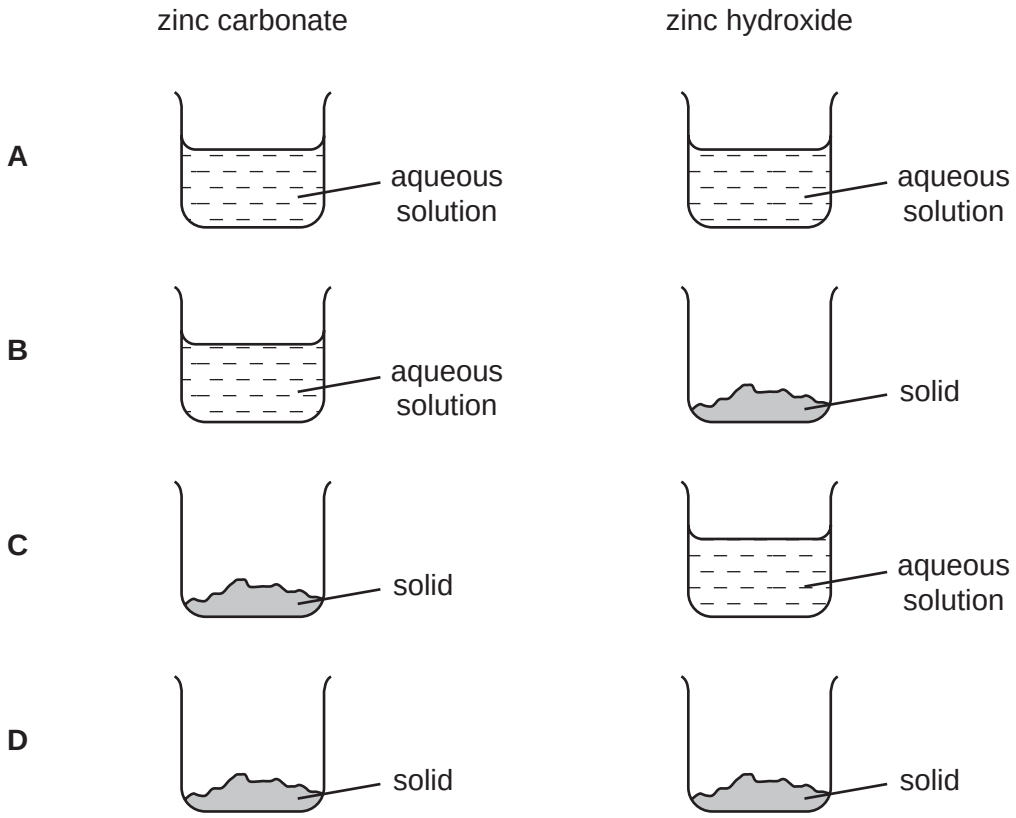
	pH change		
A	1	→	7
B	7	→	1
C	7	→	12
D	12	→	7

18 Which element has an oxide that forms a salt with an alkali?

A N **B** Na **C** Ne **D** Ni

19 Pure zinc sulphate can be prepared by adding an excess of either zinc carbonate or an excess of zinc hydroxide to dilute sulphuric acid.

In which form are these zinc compounds used?



20 Which aqueous ion causes a yellow precipitate to form when acidified aqueous lead(II) nitrate is added to it?

A chloride

B iodide

C nitrate

D sulphate

21 Which information about an element can be used to predict its chemical properties?

A colour of its compounds

B density

C melting point

D position in the Periodic Table

22 The table shows some properties of four gases.

Which gas is most suitable for filling weather balloons?

	density compared with air	chemical reactivity
A	higher	reactive
B	higher	unreactive
C	lower	reactive
D	lower	unreactive

23 A data book gives the following information about an element.

appearance	silver-grey solid
melting point	63 °C
density	0.86 g / cm^3
reaction with water	vigorous reaction with cold water

Where is the element likely to be found in the Periodic Table?

A Group 0

B Group I

C Group VII

D transition elements

24 Calcium, on the left of Period 3 of the Periodic Table, is more metallic than bromine on the right of this Period.

Why is this?

Calcium has

A fewer electrons.

B fewer protons.

C fewer full shells of electrons.

D fewer outer shell electrons.

25 Brass, an alloy of copper with another element, is used to make the contact pins of electrical plugs because it is harder than copper.

In brass, the other element is a …..**X**….. that …..**Y**….. with the copper.

What are **X** and **Y**?

	X	**Y**
A	metal	mixes
B	metal	reacts
C	non-metal	mixes
D	non-metal	reacts

26 A student added dilute hydrochloric acid to four metals and recorded his results. Not all of his results are correct.

	results	
	metal	gas given off
1	copper	yes
2	iron	yes
3	magnesium	no
4	zinc	yes

Which two results are correct?

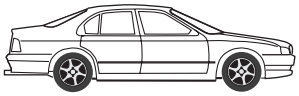
A 1 and 3 **B** 1 and 4 **C** 2 and 3 **D** 2 and 4

27 Which of the following is made from stainless steel?

A

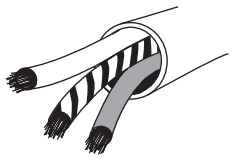
aircraft frames

B



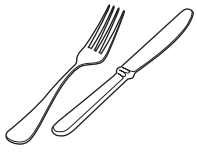
car bodies

C



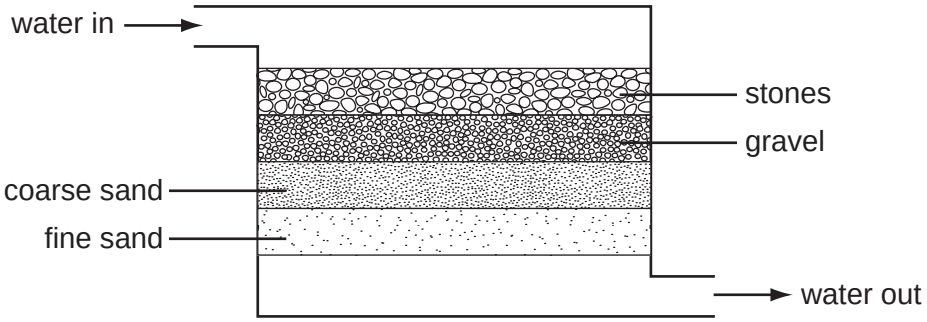
electrical cables

D



knives and forks

28 What is the purpose of the fine sand filter in the purification of the water?



A to allow particles to settle

B to sort particles into layers

C to trap large particles

D to trap small particles

29 What is formed when ethane burns incompletely but **not** when it burns completely?

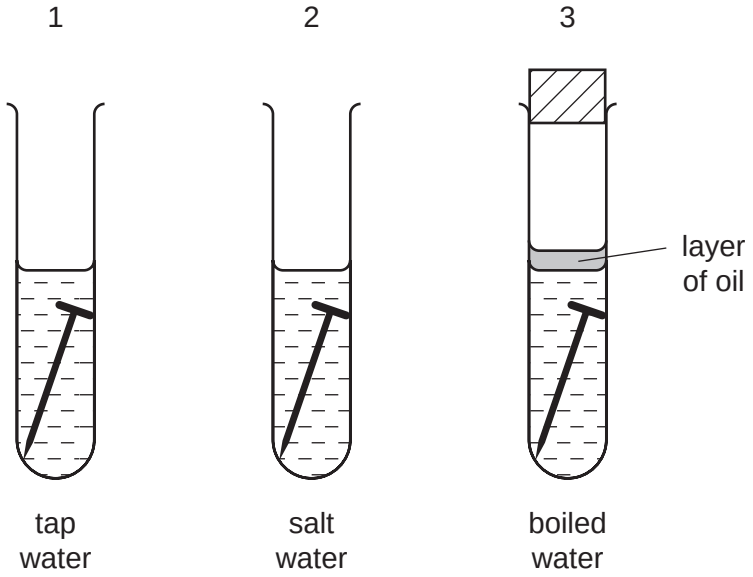
A carbon dioxide

B carbon monoxide

C ethene

D hydrogen

30 The diagrams show experiments to investigate rusting of iron nails.



In which test-tubes do the nails rust?

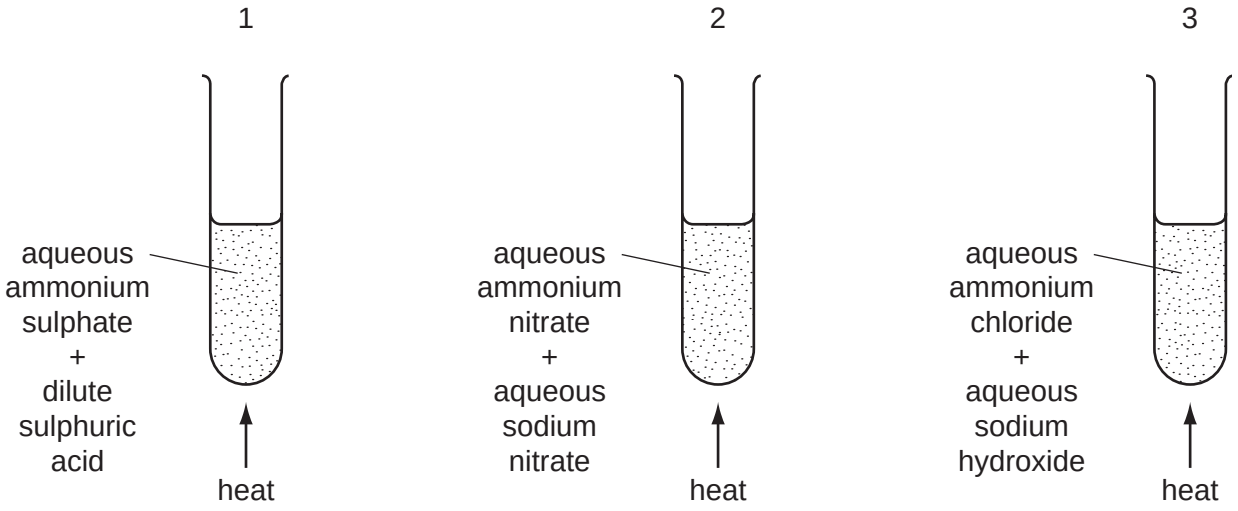
A 1 only

B 1 and 2 only

C 1 and 3 only

D 1, 2 and 3

31 The diagrams show three experiments.



In which experiments is ammonia formed?

A 1 only **B** 2 only **C** 3 only **D** 1, 2 and 3

32 In which process is carbon dioxide **not** formed?

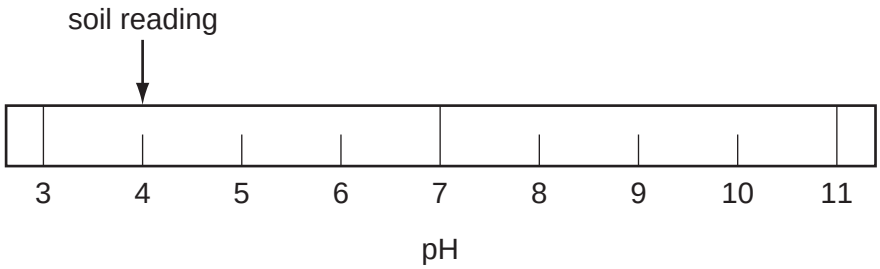
A blast furnace extraction of iron

B burning of natural gas

C heating lime

D oxy-acetylene welding

33 The diagram shows the results of a pH test on a sample of garden soil.



What could be added to the soil to change its pH to 7?

A ammonium nitrate

B lime

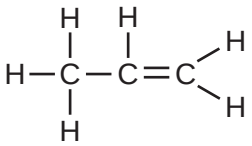
C sand

D sodium chloride

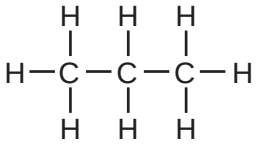
34 Some students are asked to draw the structure of propanol.

Which diagram should the students draw?

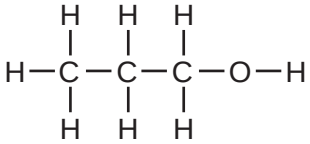
A



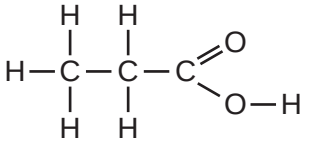
B



C



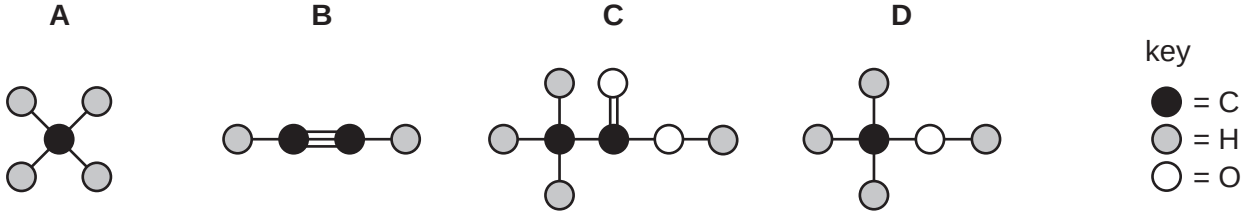
D



35 Acetylene is an unsaturated hydrocarbon used with oxygen in a welding torch.

Which diagram shows a molecule of acetylene?

A **B** **C** **D**



36 The table shows the composition of natural gas.

gas	% of natural gas
X	93.1
ethane	3.4
nitrogen	2.3

What is **X**?

A ethanol

B ethene

C methane

D propane

37 Which pair of compounds belong to the same homologous series?

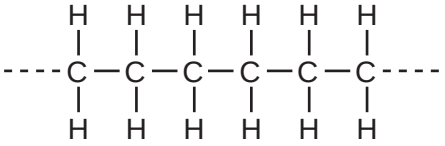
A CH_3CH_3 and $CH_3CH_2CH_3$

B CH_3CH_2OH and $CH_3OCH_2CH_3$

C $CH_2CHCH_2CH_3$ and $CH_3CH_2CH_2CH_3$

D CH_3CH_2OH and CH_2CHCH_2OH

38 The diagram shows the structure of an important product.

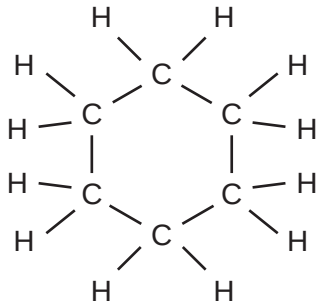


This product is formed by …..1….. of an …..2…..

Which words correctly complete gaps 1 and 2?

	1	2
A	addition polymerisation	alkane
B	addition polymerisation	alkene
C	cracking	alkane
D	cracking	alkene

39 An organic compound has the structure shown.



From knowledge of the properties of alkanes and alkenes, which reactions would be predicted for this compound?

	burn	decolourise aqueous bromine
A	✓	✓
B	✓	✗
C	✗	✓
D	✗	✗

40 Ethanol can be formed by

1 fermentation,

2 reaction between steam and ethene.

Which of these processes uses a catalyst?

	1	2
A	✓	✓
B	✓	✗
C	✗	✓
D	✗	✗

BLANK PAGE

BLANK PAGE

BLANK PAGE

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										
7 Li Lithium 3	9 Be Beryllium 4									11 B Boron 5	12 C Carbon 6	14 N Nitrogen 7	16 O Oxygen 8	19 F Fluorine 9	20 Ne Neon 10
23 Na Sodium 11	24 Mg Magnesium 12									27 Al Aluminium 13	28 Si Silicon 14	31 P Phosphorus 15	32 S Sulphur 16	35.5 Cl Chlorine 17	40 Ar Argon 18
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	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 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	119 Sn Tin 50	122 Sb Antimony 51	128 Te Tellurium 52	127 I Iodine 53	131 Xe Xenon 54
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 = 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.).