CAMBRIDGE INTERNATIONAL EXAMINATIONS

International General Certificate of Secondary Education

CHEMISTRY 0620/1

PAPER 1 Multiple Choice

MAY/JUNE SESSION 2002

45 minutes

Additional materials:
Multiple Choice answer sheet
Soft clean eraser
Soft pencil (type B or HB is recommended)

TIME 45 minutes

INSTRUCTIONS TO CANDIDATES

Do not open this booklet until you are told to do so.

Write your name, Centre number and candidate number on the answer sheet in the spaces provided unless this has already been done for you.

There are **forty** questions in 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 very carefully the instructions on the answer sheet.

INFORMATION FOR CANDIDATES

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 question paper consists of 17 printed pages and 3 blank pages.

MML 2088 9/01 S18331

UNIVERSITY *of* CAMBRIDGE
Local Examinations Syndicate

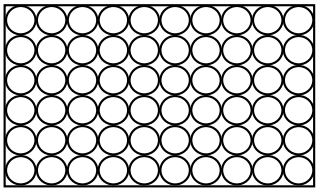
[Turn over

1 When water is warmed, what happens to its molecules?

	movement of molecules	size of molecules
A	faster	decreases
B	faster	stays the same
C	slower	decreases
D	slower	stays the same

2 Diagrams 1, 2 and 3 represent the three states of matter.

1



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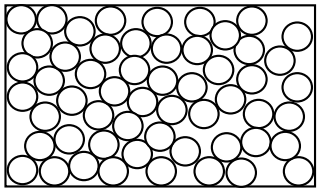
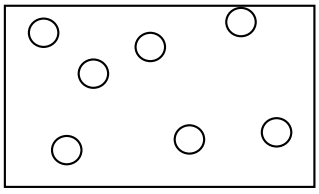


3



For which states can diffusion be demonstrated by using simple laboratory apparatus?

A 1 only

B 1 and 2

C 2 and 3

D 1, 2 and 3

3 How can crystals be obtained from a hot, concentrated solution of a salt?

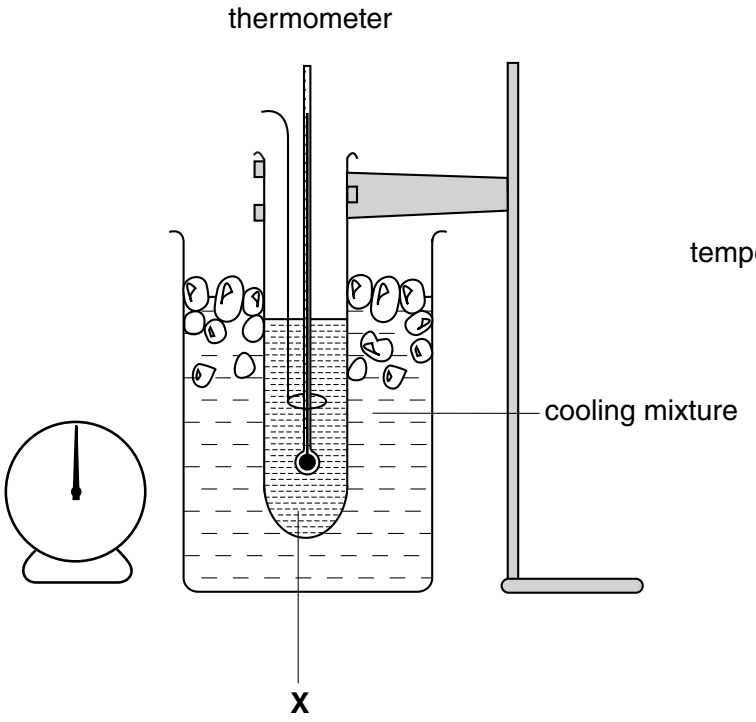
A by adding cold water

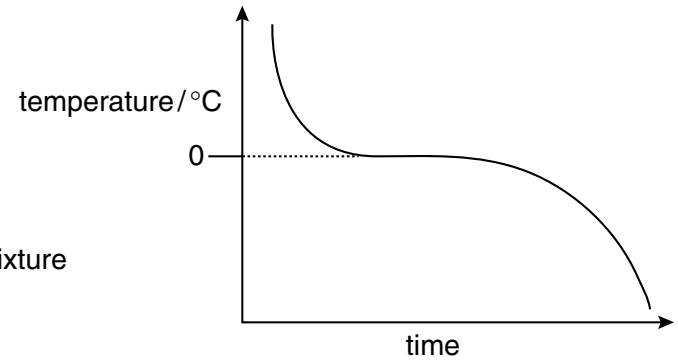
B by cooling and then filtering

C by filtering only

D by filtering and drying the residue

4 The diagrams show a cooling experiment and the results.





What liquid could **X** be?

	$H_2O(l)$	NaC*l*(aq)
A	✓	✓
B	✓	✗
C	✗	✓
D	✗	✗

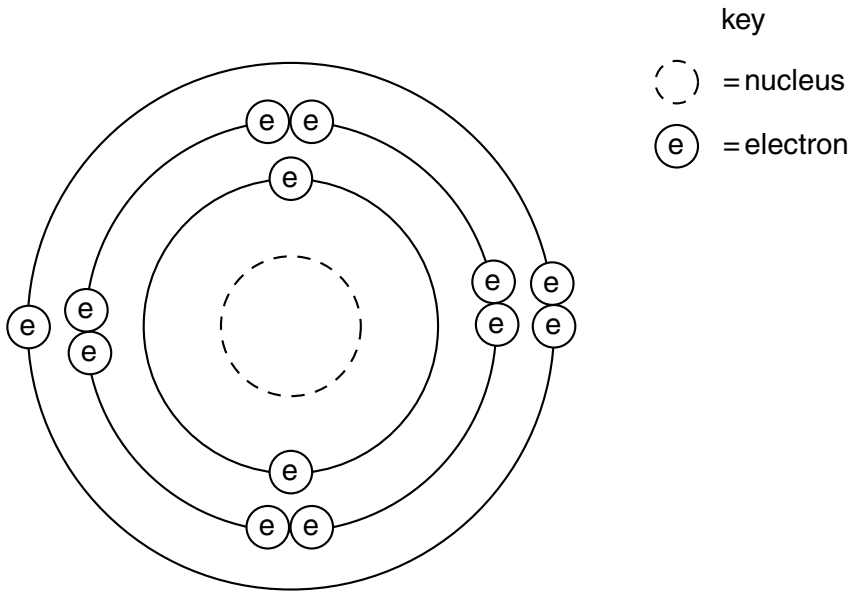
5 The symbol of an element is $^{45}_{21}Sc$.

How many electrons does one atom of this element contain?

A 21 **B** 24 **C** 45 **D** 66

[Turn over

6 The diagram shows the electronic structure of an atom.



What is the number of protons in the nucleus?

A 2 **B** 3 **C** 8 **D** 13

7 Which substance is a good conductor of electricity when solid?

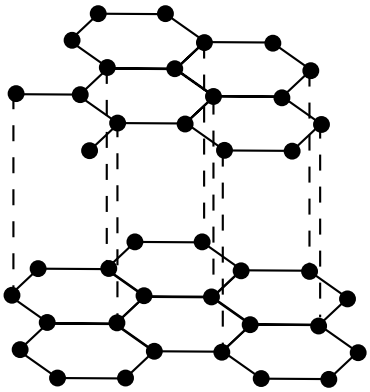
A a halogen

B a metal

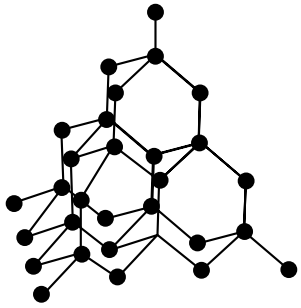
C a plastic

D a salt

8 The diagrams show the structures of two forms, X and Y, of a solid element.



X



Y

What are suitable uses of X and Y, based on their structures?

	use of solid X	use of solid Y
A	drilling	drilling
B	drilling	lubricating
C	lubricating	drilling
D	lubricating	lubricating

9 Which compound has the largest relative molecular mass, M_r?

A CO_2

B NO_2

C SiO_2

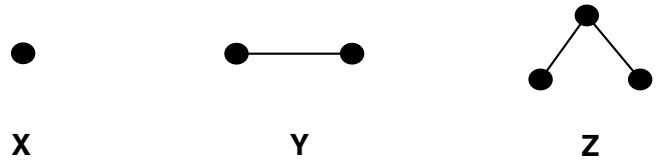
D SO_2

10 What is the formula of copper(II) oxide and of sulphur hexafluoride?

	copper(II) oxide	sulphur hexafluoride
A	CuO	S_6F
B	CuO	SF_6
C	Cu_2O	S_6F
D	Cu_2O	SF_6

[Turn over

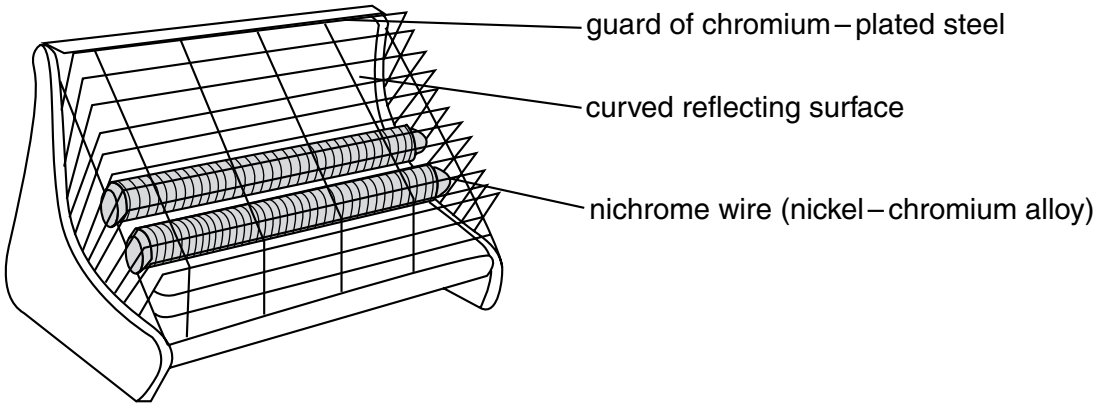
11 The diagrams show models of molecules.



Which molecules could the above models represent?

	X	Y	Z
A	helium	chlorine	water
B	helium	hydrogen chloride	methane
C	hydrogen	chlorine	water
D	hydrogen	hydrogen chloride	methane

12 The diagram shows an electric heater.



Which method would be used to plate the chromium on to the steel?

A alloying

B electrolysis

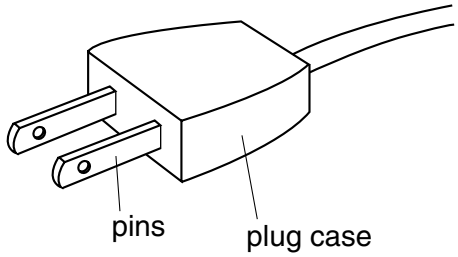
C galvanising

D oxidation

13 The table shows some properties of four materials.

material	melting point / °C	electrical conductivity when solid
W	–39	good
X	–20 to –10	poor
Y	170 to 220	poor
Z	1083	good

Which of these materials are most suitable to make the pins and the case of an electric plug?



	pins	*case*
A	**W**	**X**
B	**X**	**Z**
C	**Y**	**W**
D	**Z**	**Y**

14 Samples of four different substances are added to separate volumes of water.

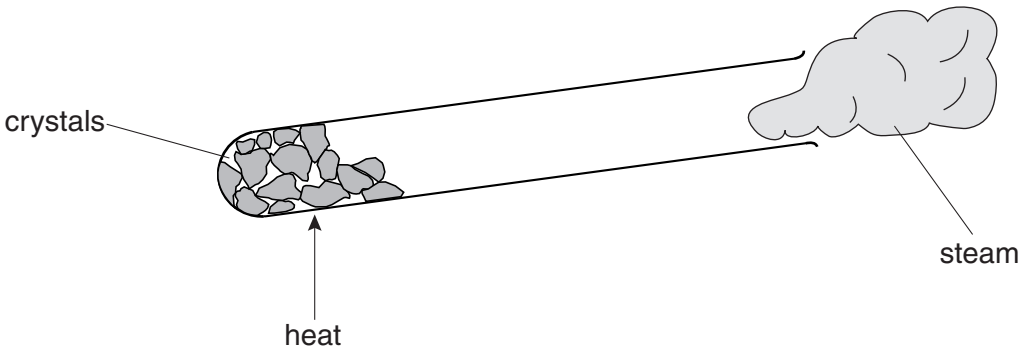
The temperature changes are measured.

For which substance does an exothermic reaction occur?

	substance added	temperature change
A	ammonium chloride	decrease
B	ethanol	none
C	ice	decrease
D	sodium	increase

[Turn over

15 The diagram shows crystals of copper(II) sulphate, $CuSO_4.5H_2O$, being heated.



The crystals change colour.

Which two terms describe this change?

A endothermic and dehydration

B endothermic and hydration

C exothermic and dehydration

D exothermic and hydration

16 A television news programme shows an explosion at a flour mill.

What could have increased the risk of such an explosion?

A adding salt to the flour

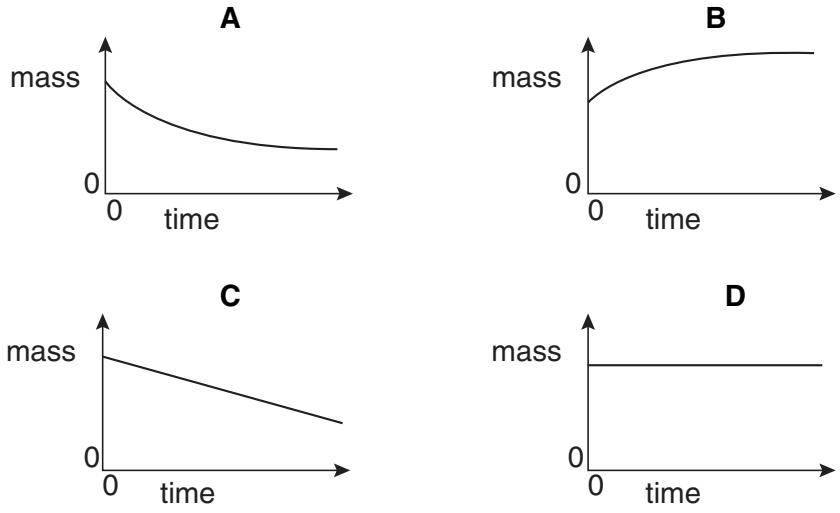
B employing more staff in the mill

C grinding the flour more finely

D opening the windows

17 The graphs show the mass of a beaker and its contents plotted against time.

Which graph could represent the reaction between magnesium and dilute hydrochloric acid in an open beaker?



18 Zinc reacts with steam to form zinc oxide and hydrogen.

$$Zn + H_2O \longrightarrow ZnO + H_2$$

During the reaction, which substance is oxidised?

A hydrogen

B water

C zinc

D zinc oxide

19 Hydrochloric acid is used to clean metals.

The acid reacts with the oxide layer on the surface of the metal, forming a salt and water.

Which word describes the metal oxide?

A alloy

B base

C element

D indicator

20 Which substance reacts with calcium to form a salt?

A hydrochloric acid

B oxygen

C sodium hydroxide

D water

21 The incomplete equation shows a reaction.

$$CuCO_3 + H_2SO_4 \longrightarrow \text{products}$$

What are the products of this reaction?

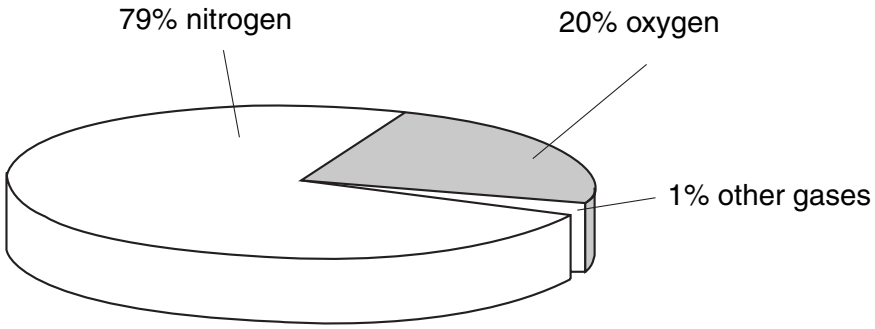
A copper(II) oxide, sulphur dioxide, hydrogen

B copper(II) oxide, sulphur dioxide, water

C copper(II) sulphate, carbon dioxide, hydrogen

D copper(II) sulphate, carbon dioxide, water

22 Air is a mixture of gases.



Which substance is present in the 'other gases' and is also unreactive?

A argon

B carbon dioxide

C hydrogen

D water vapour

23 The proton numbers of four elements are shown.

Which element is a metal?

element	proton number
A	34
B	35
C	36
D	37

24 The table shows the properties of four metals.

Which metal would be the best to make the body of an aircraft?

metal	resistance to corrosion	density
A	high	high
B	high	low
C	low	high
D	low	low

25 Which oxide can be reduced by heating it with carbon?

A aluminium oxide

B calcium oxide

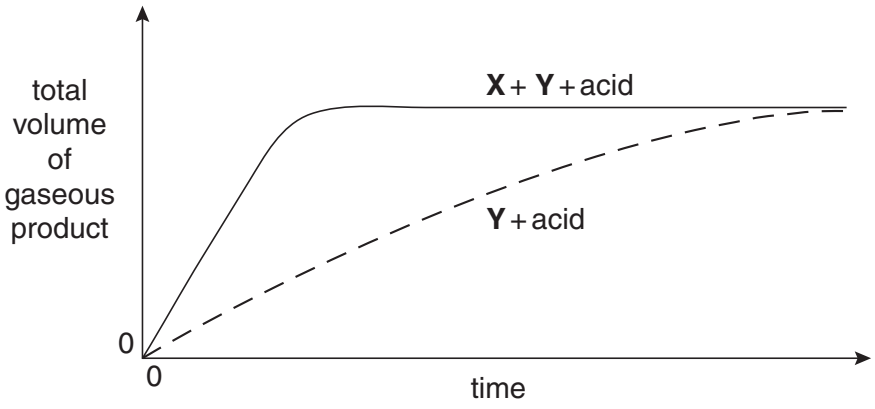
C copper(II) oxide

D potassium oxide

[Turn over

26 Substance **X** does not react with dilute acid but substance **Y** does, forming a gaseous product.

The graph shows the results of experiments with **X**, **Y** and dilute acid.



What do these results show about **X**?

	X is a catalyst	**X** is quickly used up
A	✓	✓
B	✓	✗
C	✗	✓
D	✗	✗

27 The following items are all made from metals.

Which items are made from stainless steel?

A aircraft bodies

B drink cans

C knives and forks

D motor car bodies

28 A student suggests three uses of calcium carbonate (limestone).

1 manufacture of cement

2 manufacture of iron

3 treating alkaline soils

Which of these suggestions are correct?

A 1 and 2 only

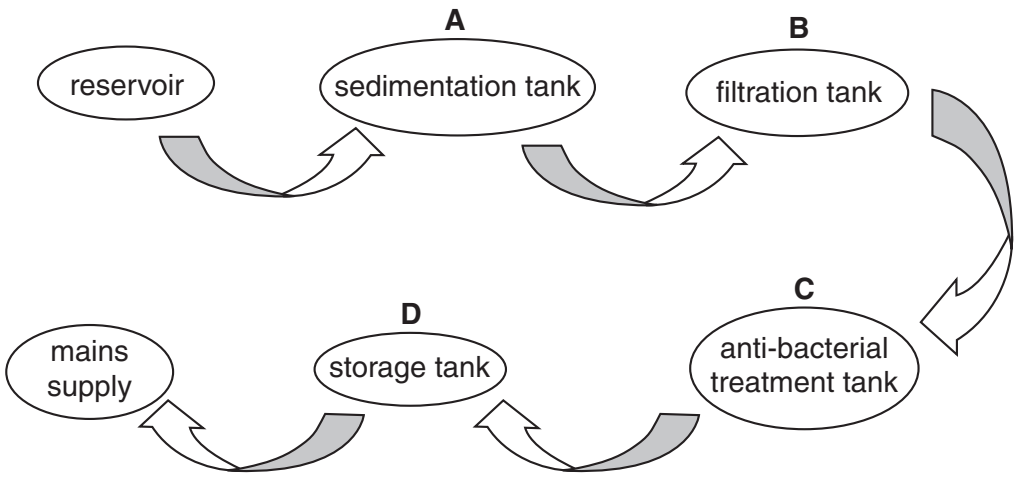
B 1 and 3 only

C 2 and 3 only

D 1, 2 and 3

29 The diagram shows stages in producing drinking water.

In which tank is chlorine added to the water?



30 Which gas is produced by the incomplete combustion of coal?

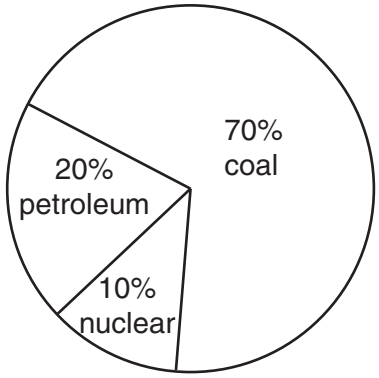
A carbon dioxide

B carbon monoxide

C nitrogen dioxide

D sulphur dioxide

31 The diagram shows the sources of energy a country uses to generate electricity.



What is the total percentage of fuels used which, when burned, could cause 'acid rain'?

A 20% **B** 80% **C** 90% **D** 100%

32 Which of the following does **not** need a supply of oxygen in use?

A breathing apparatus in hospitals

B a fire extinguisher

C an acetylene welding torch

D a petrol engine

33 To grow tomatoes, a fertiliser containing nitrogen, phosphorus and potassium is needed. For a good yield, the fertiliser should contain a high percentage of potassium.

Which fertiliser is best for tomatoes?

fertiliser	percentage by mass		
	N	P	K
A	29	13	0
B	29	5	5
C	13	13	20
D	9	0	25

34 Buildings made of calcium carbonate can react with 'acid rain'.

Which gas is formed as a result of this?

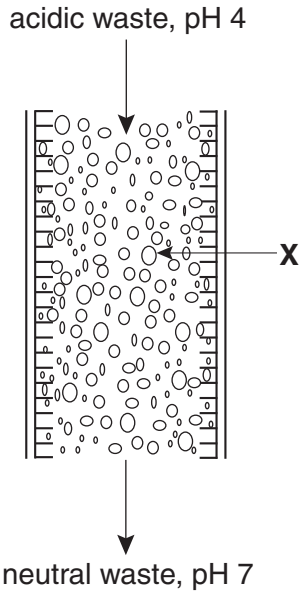
A carbon dioxide

B carbon monoxide

C nitrogen dioxide

D sulphur dioxide

35 Acidic waste gases from a factory are treated with substance **X** as shown.



What is **X**?

A polythene

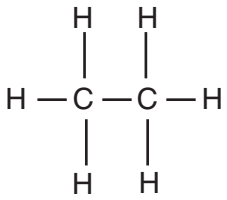
B slaked lime

C vinegar

D water

36 What is the structure of the product of the catalytic addition of steam to ethene?

A



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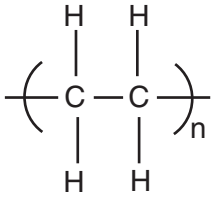
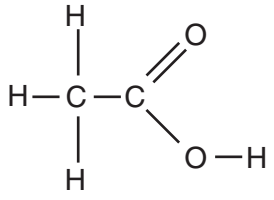
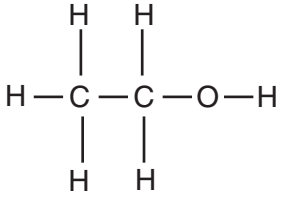


C



D



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37 Which process is used at an oil refinery?

A cracking

B electrolysis

C fermentation

D neutralisation

38 Which statement is correct **both** for methane **and** for ethane?

A They are alcohols.

B They are alkenes.

C They are in the same homologous series.

D They can undergo addition polymerisation.

39 Which reaction is an example of the **cracking** of an alkane?

A $3C_2H_4 \longrightarrow C_6H_{12}$

B $C_6H_{14} \longrightarrow 6C + 7H_2$

C $C_6H_{12} + H_2 \longrightarrow C_6H_{14}$

D $C_6H_{14} \longrightarrow C_2H_4 + C_4H_{10}$

40 In ripe fruit, the conversion of sugars into alcohol can occur naturally.

What is the name of this process?

A addition

B cracking

C fermentation

D polymerisation

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DATA SHEET
The Periodic Table of the Elements

Group																	
I	II											III	IV	V	VI	VII	0
							1 H Hydrogen 1										4 He Helium 2
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.).