

**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.

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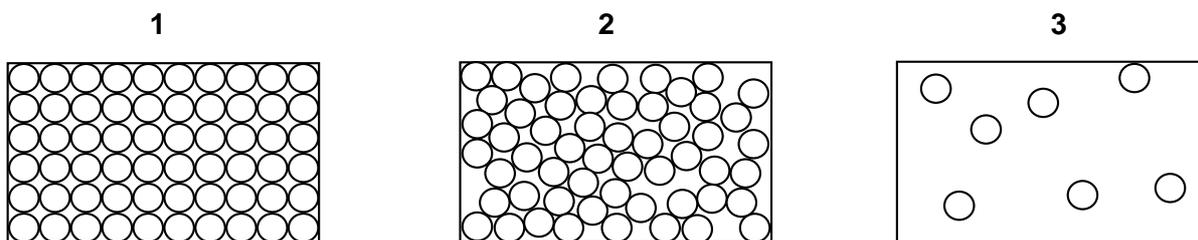
**This question paper consists of 17 printed pages and 3 blank pages.**



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

	movement of molecules	size of molecules
<b>A</b>	faster	decreases
<b>B</b>	faster	stays the same
<b>C</b>	slower	decreases
<b>D</b>	slower	stays the same

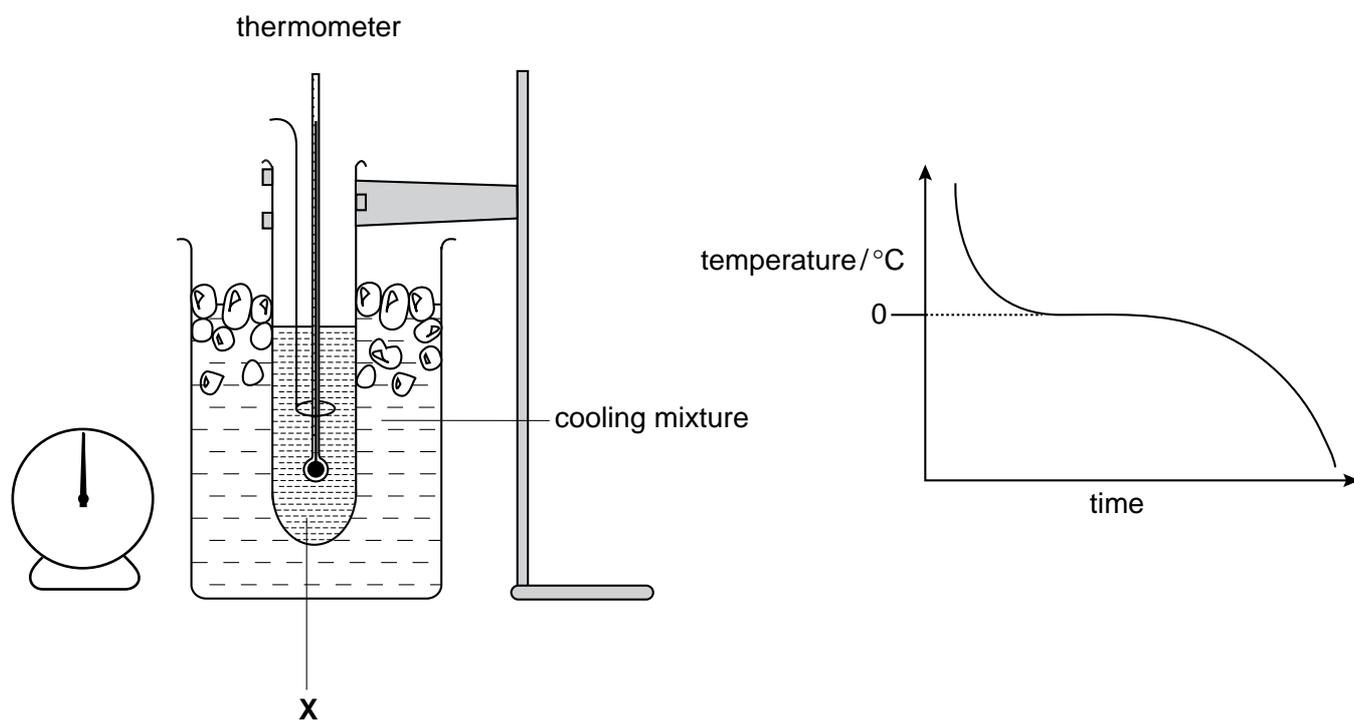
2 Diagrams 1, 2 and 3 represent the three states of matter.



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?

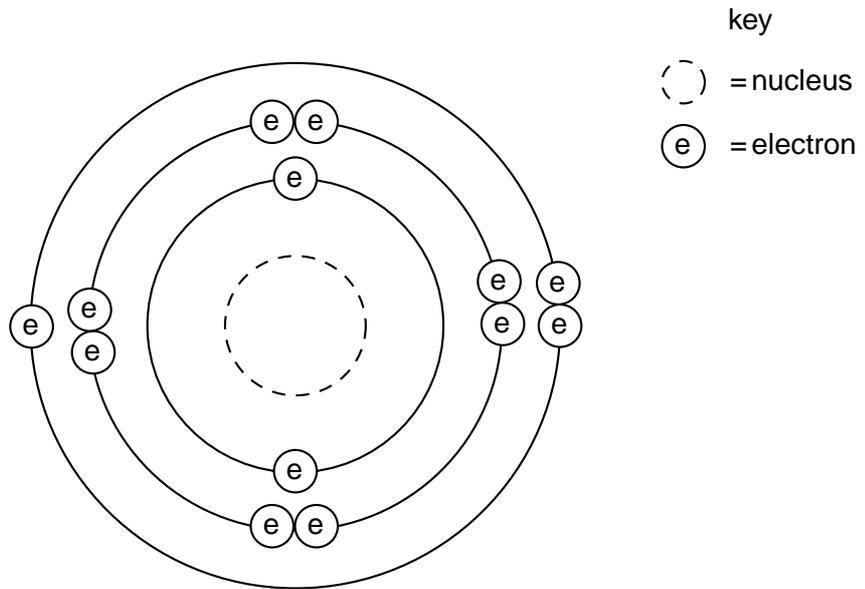
	H <sub>2</sub> O(l)	NaCl(aq)
<b>A</b>	✓	✓
<b>B</b>	✓	✗
<b>C</b>	✗	✓
<b>D</b>	✗	✗

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

How many electrons does one atom of this element contain?

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

6 The diagram shows the electronic structure of an atom.



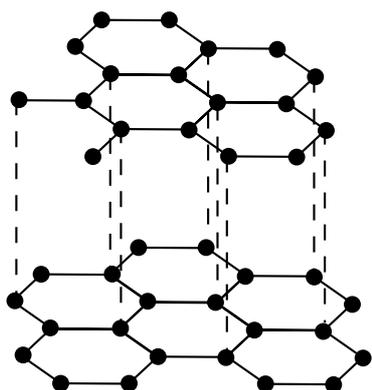
What is the number of protons in the nucleus?

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

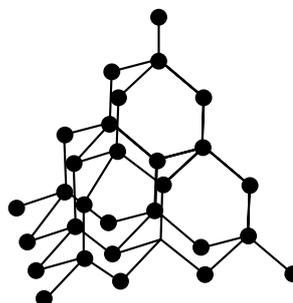
7 Which substance is a good conductor of electricity when solid?

- 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
<b>A</b>	drilling	drilling
<b>B</b>	drilling	lubricating
<b>C</b>	lubricating	drilling
<b>D</b>	lubricating	lubricating

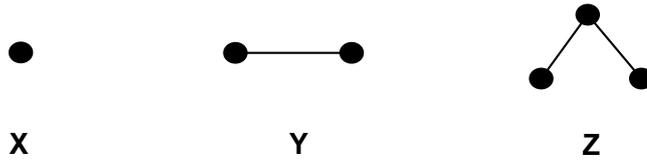
- 9 Which compound has the largest relative molecular mass,  $M_r$ ?

- A**  $\text{CO}_2$
- B**  $\text{NO}_2$
- C**  $\text{SiO}_2$
- D**  $\text{SO}_2$

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

	copper(II) oxide	sulphur hexafluoride
<b>A</b>	$\text{CuO}$	$\text{S}_6\text{F}$
<b>B</b>	$\text{CuO}$	$\text{SF}_6$
<b>C</b>	$\text{Cu}_2\text{O}$	$\text{S}_6\text{F}$
<b>D</b>	$\text{Cu}_2\text{O}$	$\text{SF}_6$

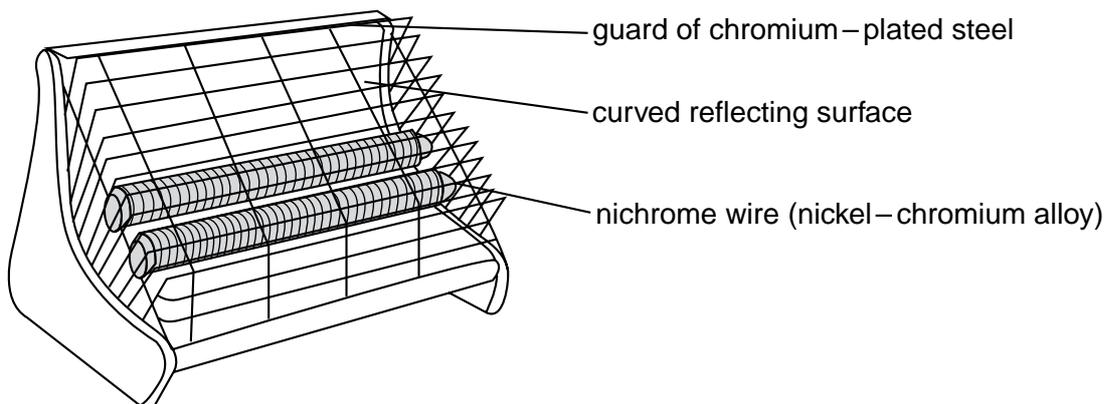
11 The diagrams show models of molecules.



Which molecules could the above models represent?

	<b>X</b>	<b>Y</b>	<b>Z</b>
<b>A</b>	helium	chlorine	water
<b>B</b>	helium	hydrogen chloride	methane
<b>C</b>	hydrogen	chlorine	water
<b>D</b>	hydrogen	hydrogen chloride	methane

12 The diagram shows an electric heater.



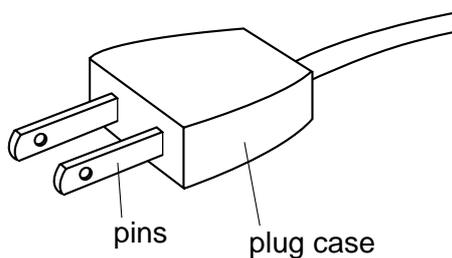
Which method would be used to plate the chromium on to the steel?

- 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
<b>W</b>	-39	good
<b>X</b>	-20 to -10	poor
<b>Y</b>	170 to 220	poor
<b>Z</b>	1083	good

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



	<i>pins</i>	<i>case</i>
<b>A</b>	<b>W</b>	<b>X</b>
<b>B</b>	<b>X</b>	<b>Z</b>
<b>C</b>	<b>Y</b>	<b>W</b>
<b>D</b>	<b>Z</b>	<b>Y</b>

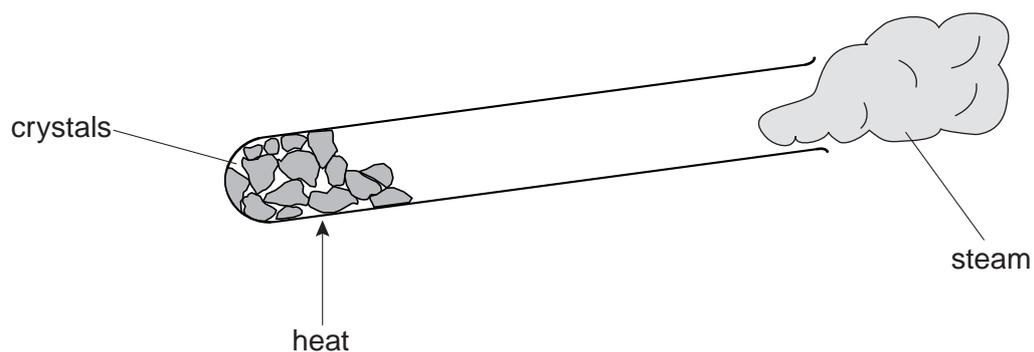
14 Samples of four different substances are added to separate volumes of water.

The temperature changes are measured.

For which substance does an exothermic reaction occur?

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

- 15 The diagram shows crystals of copper(II) sulphate,  $\text{CuSO}_4 \cdot 5\text{H}_2\text{O}$ , being heated.



The crystals change colour.

Which two terms describe this change?

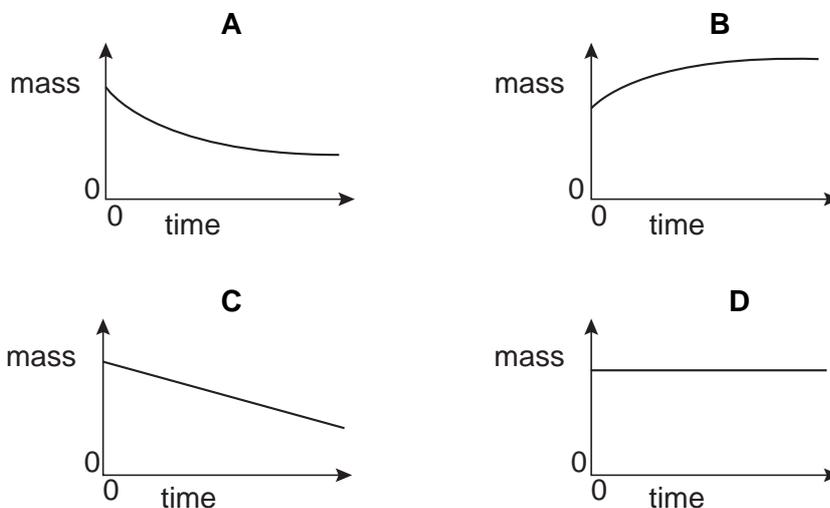
- A endothermic and dehydration
  - B endothermic and hydration
  - C exothermic and dehydration
  - D exothermic and hydration
- 16 A television news programme shows an explosion at a flour mill.

What could have increased the risk of such an explosion?

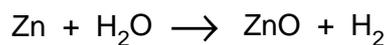
- A adding salt to the flour
- B employing more staff in the mill
- C grinding the flour more finely
- D opening the windows

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.



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

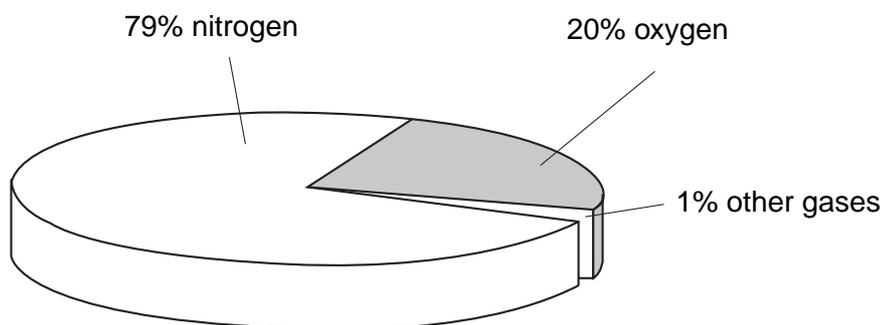
21 The incomplete equation shows a reaction.



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
<b>A</b>	34
<b>B</b>	35
<b>C</b>	36
<b>D</b>	37

24 The table shows the properties of four metals.

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

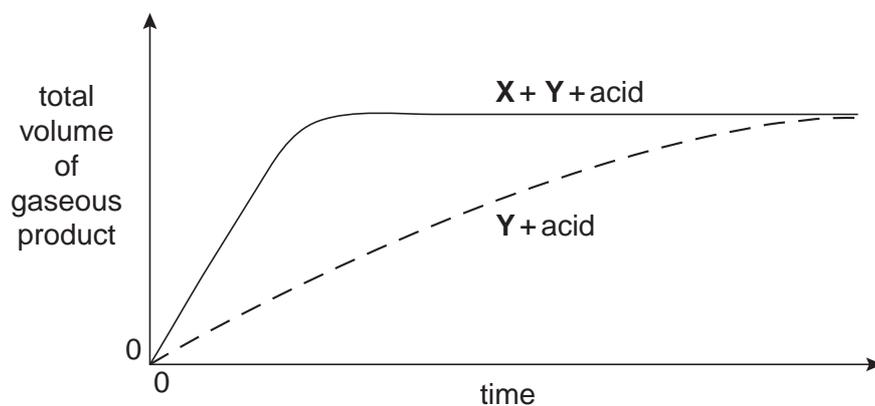
metal	resistance to corrosion	density
<b>A</b>	high	high
<b>B</b>	high	low
<b>C</b>	low	high
<b>D</b>	low	low

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

- A** aluminium oxide
- B** calcium oxide
- C** copper(II) oxide
- D** potassium oxide

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**?

	<b>X</b> is a catalyst	<b>X</b> is quickly used up
<b>A</b>	✓	✓
<b>B</b>	✓	✗
<b>C</b>	✗	✓
<b>D</b>	✗	✗

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).

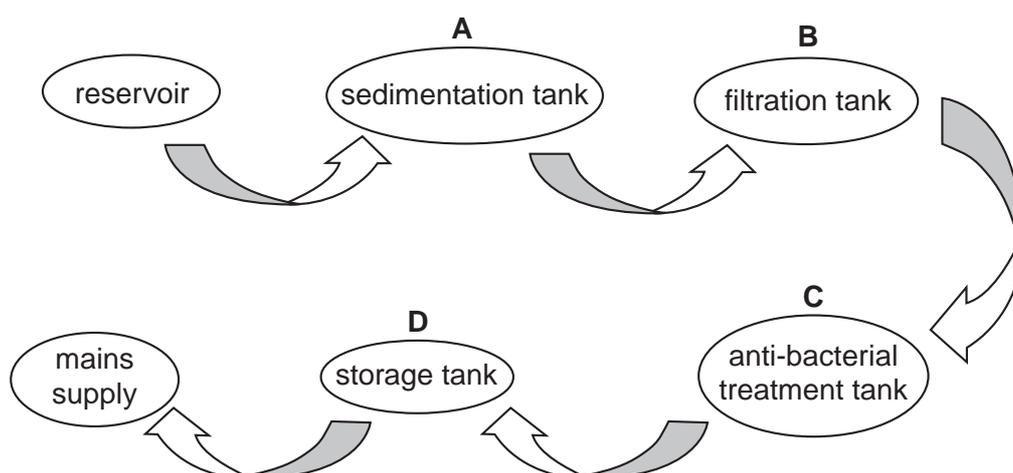
- 1 manufacture of cement
- 2 manufacture of iron
- 3 treating alkaline soils

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.

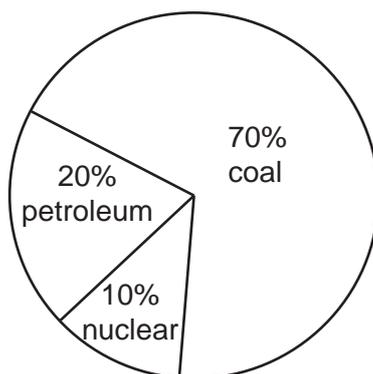
In which tank is chlorine added to the water?



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?

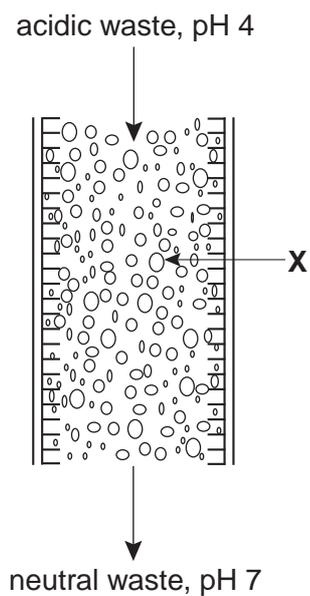
fertiliser	percentage by mass		
	N	P	K
<b>A</b>	29	13	0
<b>B</b>	29	5	5
<b>C</b>	13	13	20
<b>D</b>	9	0	25

- 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 
$$\begin{array}{c} \text{H} \quad \text{H} \\ | \quad | \\ \text{H}-\text{C}-\text{C}-\text{H} \\ | \quad | \\ \text{H} \quad \text{H} \end{array}$$
- B 
$$\left( \begin{array}{c} \text{H} \quad \text{H} \\ | \quad | \\ \text{---} \text{C} - \text{C} \text{---} \\ | \quad | \\ \text{H} \quad \text{H} \end{array} \right)_n$$
- C 
$$\begin{array}{c} \text{H} \\ | \\ \text{H}-\text{C}-\text{C} \\ | \quad // \quad \backslash \\ \text{H} \quad \text{O} \quad \text{O}-\text{H} \end{array}$$
- D 
$$\begin{array}{c} \text{H} \quad \text{H} \\ | \quad | \\ \text{H}-\text{C}-\text{C}-\text{O}-\text{H} \\ | \quad | \\ \text{H} \quad \text{H} \end{array}$$

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  $3\text{C}_2\text{H}_4 \rightarrow \text{C}_6\text{H}_{12}$
- B  $\text{C}_6\text{H}_{14} \rightarrow 6\text{C} + 7\text{H}_2$
- C  $\text{C}_6\text{H}_{12} + \text{H}_2 \rightarrow \text{C}_6\text{H}_{14}$
- D  $\text{C}_6\text{H}_{14} \rightarrow \text{C}_2\text{H}_4 + \text{C}_4\text{H}_{10}$

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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