



Cambridge IGCSE™

CHEMISTRY

0620/12

Paper 1 Multiple Choice (Core)

February/March 2020

45 minutes

You must answer on the multiple choice answer sheet.

You will need: Multiple choice answer sheet
Soft clean eraser
Soft pencil (type B or HB is recommended)

INSTRUCTIONS

- 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 multiple choice answer sheet.
- Follow the instructions on the multiple choice answer sheet.
- Write in soft pencil.
- Write your name, centre number and candidate number on the multiple choice answer sheet in the spaces provided unless this has been done for you.
- Do **not** use correction fluid.
- Do **not** write on any bar codes.
- You may use a calculator.

INFORMATION

- The total mark for this paper is 40.
- Each correct answer will score one mark. A mark will not be deducted for a wrong answer.
- Any rough working should be done on this question paper.
- The Periodic Table is printed in the question paper.

This document has **16** pages. Blank pages are indicated.



2

- 1 Which row represents the particles of a gas colliding most frequently?

	pressure	temperature
A	high	high
B	high	low
C	low	high
D	low	low

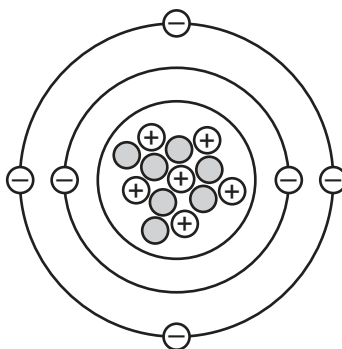
- 2 Which test is used to show that a sample of water is pure?

- A** Evaporate the water to see if any solids remain.
- B** Heat the water to check its boiling point.
- C** Test with anhydrous cobalt(II) chloride.
- D** Use universal indicator paper to check its pH.

- 3 Which piece of apparatus is used to measure 1.5 cm^3 of a solution accurately?

- A** 25 cm^3 measuring cylinder
- B** 25 cm^3 pipette
- C** 50 cm^3 measuring cylinder
- D** 50 cm^3 burette

- 4 A representation of an atom is shown.



What is the nucleon number of this atom?

- A** 6
- B** 7
- C** 12
- D** 13

3

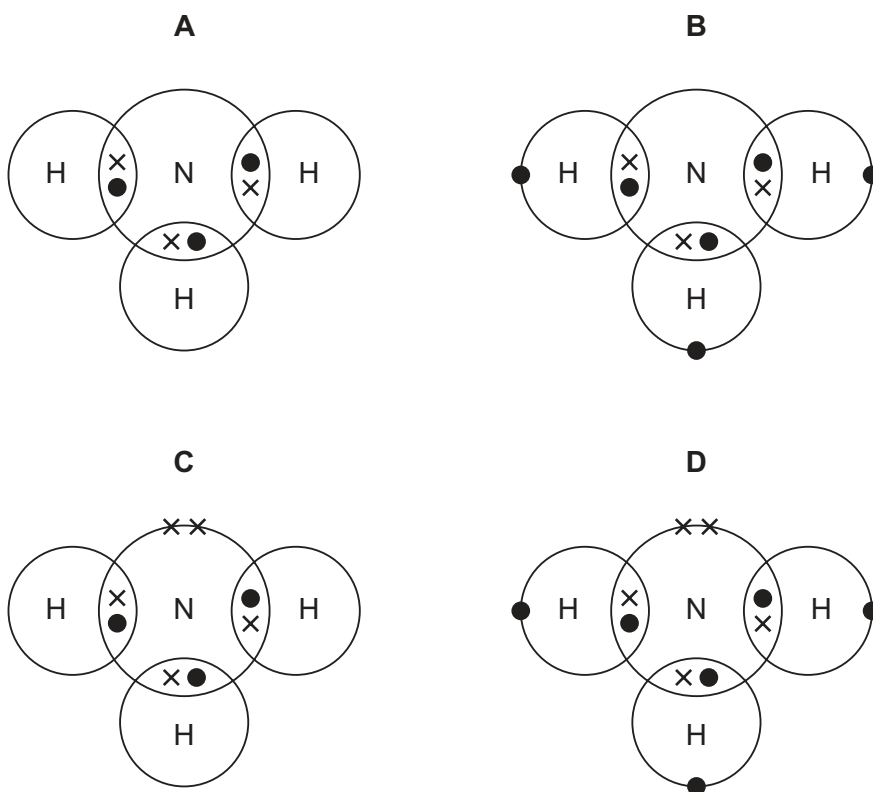
- 5 Lithium reacts with fluorine to form the compound lithium fluoride.

Which statement about this reaction is correct?

- A Each fluorine atom gains one electron.
- B Each fluorine atom gains two or more electrons.
- C Each fluorine atom loses one electron.
- D Each fluorine atom loses two or more electrons.

- 6 Ammonia, NH_3 , is a covalent molecule.

Which diagram shows the outer shell electron arrangement in a molecule of ammonia?



- 7 Which row describes the structure and a use of diamond?

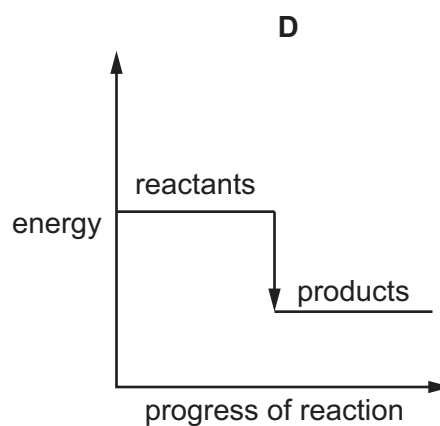
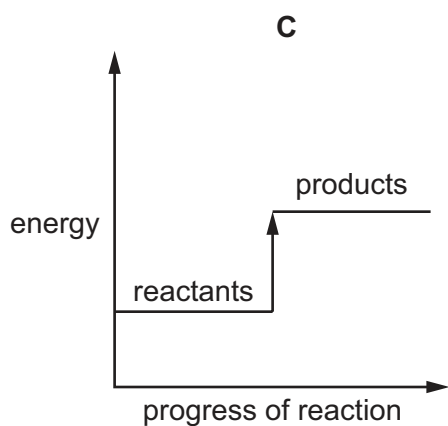
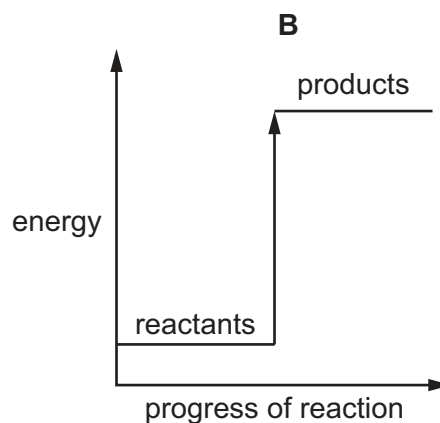
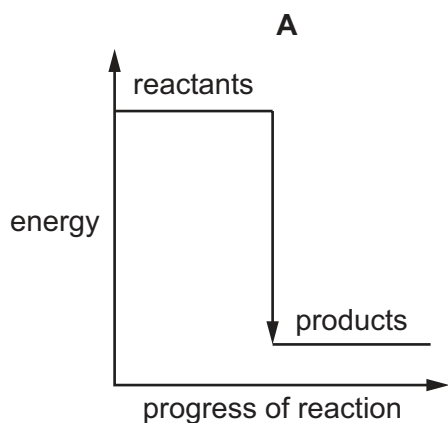
	structure	use
A	ionic	in cutting tools
B	ionic	lubricant
C	macromolecular	in cutting tools
D	macromolecular	lubricant

4

- 8 Methane, CH_4 , burns in air to form carbon dioxide and water.

What is the balanced equation for this reaction?

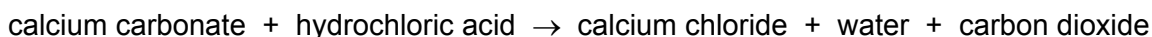
- A $\text{CH}_4(\text{g}) + \text{O}_2(\text{g}) \rightarrow \text{CO}_2(\text{g}) + 2\text{H}_2\text{O}(\text{g})$
B $\text{CH}_4(\text{g}) + 2\text{O}_2(\text{g}) \rightarrow \text{CO}_2(\text{g}) + 2\text{H}_2\text{O}(\text{g})$
C $\text{CH}_4(\text{g}) + 2\text{O}_2(\text{g}) \rightarrow \text{CO}_2(\text{g}) + \text{H}_2\text{O}(\text{g})$
D $\text{CH}_4(\text{g}) + 3\text{O}_2(\text{g}) \rightarrow \text{CO}_2(\text{g}) + 2\text{H}_2\text{O}(\text{g})$
- 9 Which statement about electrolysis is correct?
- A Chemical energy is converted to electrical energy.
B Electrons flow through the electrolyte.
C Ionic compounds are broken down.
D Metals are formed at the positive electrode.
- 10 Which energy level diagram shows the reaction that will give out the most energy?



11 Which change is a physical change?

- A Copper(II) carbonate changes colour from green to black when it is heated, and stays black when it cools.
- B Ethanol reacts with oxygen to form carbon dioxide and water.
- C Hydrogen peroxide decomposes into water and oxygen when it is boiled.
- D Ice forms liquid water when it is heated.

12 Marble chips (calcium carbonate) react with hydrochloric acid in an exothermic reaction.

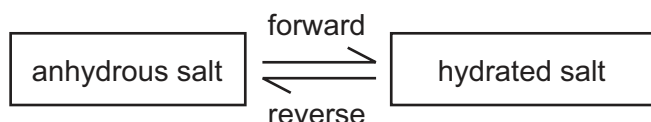


When excess marble chips are added to dilute hydrochloric acid the rate of the reaction starts off fast, then gets slower until the reaction stops.

Why does the reaction rate get slower?

- A The concentration of the hydrochloric acid is decreasing.
- B The concentration of calcium chloride is increasing.
- C The calcium carbonate is completely used up.
- D The temperature of the mixture decreases.

13 The diagram shows the change from an anhydrous salt to its hydrated form.

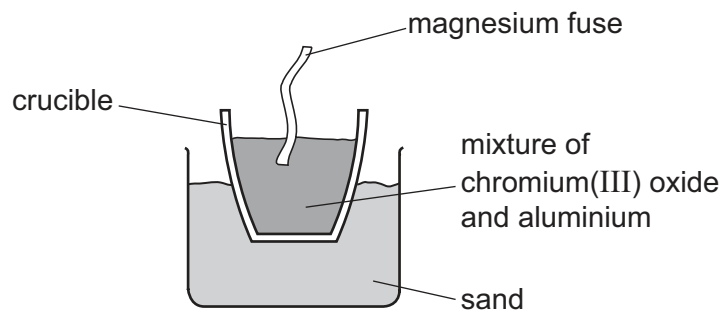


Which statement is correct?

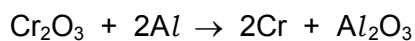
- A The forward reaction requires heat and water.
- B The forward reaction requires water only.
- C The reverse reaction requires heat and water.
- D The reverse reaction requires water only.

6

- 14** A violent reaction occurs when a mixture of chromium(III) oxide and aluminium is ignited with a magnesium fuse as shown.



The equation for the reaction is shown.



Which substance is oxidised in the reaction?

- A** aluminium
 - B** aluminium oxide
 - C** chromium
 - D** chromium(III) oxide
- 15** A farmer's soil is acidic.

Which substance should the farmer add to neutralise the soil?

- A** ammonium sulfate
- B** calcium oxide
- C** hydrochloric acid
- D** NPK fertiliser

7

16 Three elements, X, Y and Z, are burned in oxygen.

The oxides formed are dissolved in water and the pH of the solutions measured.

The results are shown.

	pH of oxide solution
X	2.0
Y	14.0
Z	8.0

Which statements are correct?

- 1 Element X could be sulfur.
- 2 Element Y could be sodium.
- 3 Element Z is a non-metal.
- 4 No metal elements were used.

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

17 The following substances can be reacted together to prepare salts.

- 1 copper(II) oxide and excess hydrochloric acid
- 2 hydrochloric acid and excess sodium hydroxide
- 3 hydrochloric acid and excess zinc carbonate

In which reactions can the excess reactant be separated from the solution by filtration?

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

What is the identity of S?

- [illegible]

A X is more reactive than Y, and W is more reactive than Z.

B X is more reactive than Y, and Z is more reactive than W.

C Y is more reactive than X, and W is more reactive than Z.

D Y is more reactive than X, and Z is more reactive than W.

21 Some properties of substances are listed.

- 1 They conduct electricity.
- 2 They have low densities.
- 3 They have high melting points.
- 4 They are malleable.

Which properties are shown by transition metals?

- A** 1 and 3 only **B** 1 and 4 only **C** 1, 2 and 3 **D** 1, 3 and 4

22 Which statement about the noble gas argon is correct?

- A** It burns with a hot flame.
- B** It is used in airships because of its low density.
- C** It exists as diatomic molecules.
- D** It has eight electrons in its outermost shell.

23 Sodium is a Group I metal.

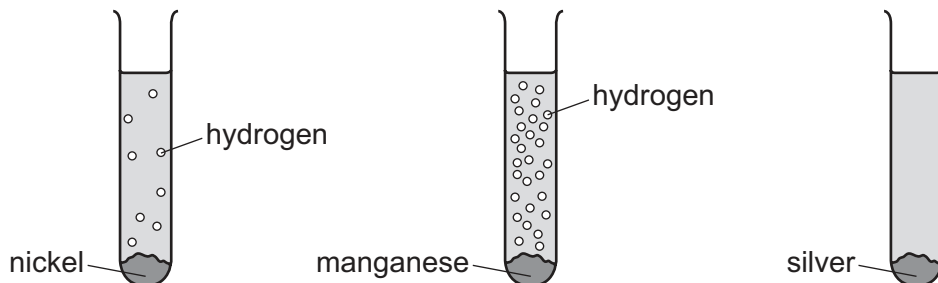
Which property, that is typical of most metals, is **not** shown by sodium?

- A** conductor of heat
- B** high melting point
- C** malleable
- D** shiny

24 Manganese, nickel and silver are all metals.

Samples of powdered manganese, nickel and silver were placed in separate test-tubes containing dilute hydrochloric acid.

The results are shown.



What is the order of reactivity of the metals, most reactive to least reactive?

- A** manganese → nickel → silver
- B** manganese → silver → nickel
- C** silver → manganese → nickel
- D** silver → nickel → manganese

25 Which statement about aluminium is correct?

- A** Aluminium is easy to extract from its ore because it is near the bottom of the reactivity series.
- B** Aluminium is formed when aluminium oxide is heated with carbon.
- C** Bauxite is an important ore of aluminium.
- D** Hematite is an important ore of aluminium.

26 Some properties of aluminium are listed.

- 1 It conducts heat.
- 2 It has a low density.
- 3 It is strong.
- 4 It is resistant to corrosion.

Which of these properties make aluminium suitable for making food containers for chilled food products?

- A** 1, 2 and 4
- B** 1, 3 and 4
- C** 1 only
- D** 4 only

27 Water is treated at a waterworks to make it fit to drink.

What is present in the water when it leaves the waterworks?

- A** bacteria only
- B** bacteria and insoluble substances
- C** chlorine compounds only
- D** chlorine compounds and soluble substances

28 Sulfur dioxide, carbon monoxide and oxides of nitrogen are common gaseous pollutants found in the air.

Which pollutants contribute to acid rain?

- A** carbon monoxide and sulfur dioxide
- B** oxides of nitrogen and sulfur dioxide
- C** oxides of nitrogen only
- D** sulfur dioxide only

29 Which methods prevent iron from rusting?

	coating with zinc	painting	washing with salt water
A	✓	✓	✓
B	x	✓	✓
C	✓	✓	x
D	✓	x	x

key

✓ = prevents rusting

x = does not prevent rusting

30 Fertilisers are mixtures of different compounds used to increase the growth of crops.

Which pair of substances contain the three essential elements for plant growth?

- A** ammonium nitrate and calcium phosphate
- B** ammonium nitrate and potassium chloride
- C** ammonium phosphate and potassium chloride
- D** potassium nitrate and calcium carbonate

31 Which process does **not** add a greenhouse gas to the atmosphere?

- A burning methane
- B decomposition of vegetation
- C polymerisation
- D respiration

32 Why is sulfur dioxide used as a food preservative?

- A It is a gas at room temperature.
- B It is used to make sulfuric acid.
- C It kills bacteria.
- D It reacts with alkalis.

33 Which statements about lime (calcium oxide) and limestone (calcium carbonate) are correct?

- 1 Limestone is used in the manufacture of iron.
- 2 Lime is made by heating limestone.
- 3 Powdered limestone is heated with clay in the production of cement.
- 4 Limestone causes soil to be acidic.

- A 1 and 2 only B 2 and 3 only C 1, 2 and 3 D 1, 3 and 4

34 The formulae of two organic compounds, P and Q, are shown.



Which type of organic compounds are P and Q?

	P	Q
A	alcohol	alkane
B	alcohol	alkene
C	carboxylic acid	alkane
D	carboxylic acid	alkene

35 Petroleum is an important raw material that is separated into useful products.

Which terms describe petroleum and the method used to separate it?

	description	separation method
A	compound	cracking
B	compound	fractional distillation
C	mixture	cracking
D	mixture	fractional distillation

36 Which type of compound is a member of a homologous series?

- A** carbonate
- B** carboxylic acid
- C** halogen
- D** hydroxide

37 Which statements about propene are correct?

- 1 Propene contains only single bonds.
- 2 Propene decolourises bromine water.
- 3 Propene is obtained by cracking.
- 4 Propene is a hydrocarbon.

- A** 1 and 4 **B** 2, 3 and 4 **C** 2 and 4 only **D** 4 only

38 Which row describes the production of ethanol and its properties?

	can be made from glucose	can be made from ethene	is used as a fuel	is used as a solvent
A	✓	✓	✓	✓
B	✓	x	✓	✓
C	x	✓	✓	x
D	x	✓	x	✓

key
✓ = yes
x = no

14**39** Which statements about ethanoic acid are correct?

- 1 It contains a carbon–oxygen double bond.
- 2 It contains two carbon atoms.
- 3 It decolourises bromine water.
- 4 It contains an –OH group.

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

40 Which polymers are natural polymers?

- 1 carbohydrates
- 2 poly(ethene)
- 3 protein

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

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The Periodic Table of Elements

Group																			
I	II											III	IV	V	VI	VII	VIII		
												1 H hydrogen 1							

lanthanoids

actinoids

57 La lanthanum 139	58 Ce cerium 140	59 Pr praseodymium 141	60 Nd neodymium 144	61 Pm promethium —	62 Sm samarium 150	63 Eu europium 152	64 Gd gadolinium 157	65 Tb terbium 159	66 Dy dysprosium 163	67 Ho holmium 165	68 Er erbium 167	69 Tm thulium 169	70 Yb ytterbium 173	71 Lu lutetium 175
89 Ac actinium —	90 Th thorium 232	91 Pa protactinium 231	92 U uranium 238	93 Np neptunium —	94 Pu plutonium —	95 Am americium —	96 Cm curium —	97 Bk berkelium —	98 Cf californium —	99 Es einsteinium —	100 Fm fermium —	101 Md mendelevium —	102 No nobelium —	103 Lr lawrencium —

The volume of one mole of any gas is 24 dm³ at room temperature and pressure (r.t.p.).