



UNIVERSITY OF CAMBRIDGE INTERNATIONAL EXAMINATIONS
International General Certificate of Secondary Education

CHEMISTRY

0620/01

Paper 1 Multiple Choice

October/November 2007

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.

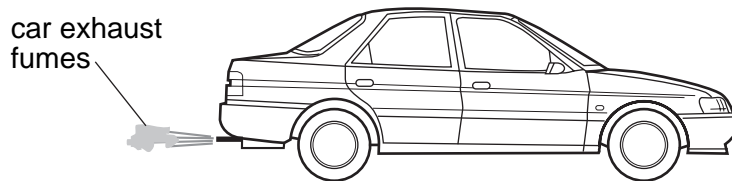
A copy of the Periodic Table is printed on page 20.

You may use a calculator.

This document consists of **18** printed pages and **2** blank pages.



- 1 Oxides of nitrogen from car exhausts can spread through the atmosphere.



This occurs because gas molecules move from a region of1..... concentration to a region of2..... concentration by a process called3..... .

Which words correctly complete the gaps?

| | 1 | 2 | 3 |
|----------|------|------|-------------|
| A | high | low | diffusion |
| B | high | low | evaporation |
| C | low | high | diffusion |
| D | low | high | evaporation |

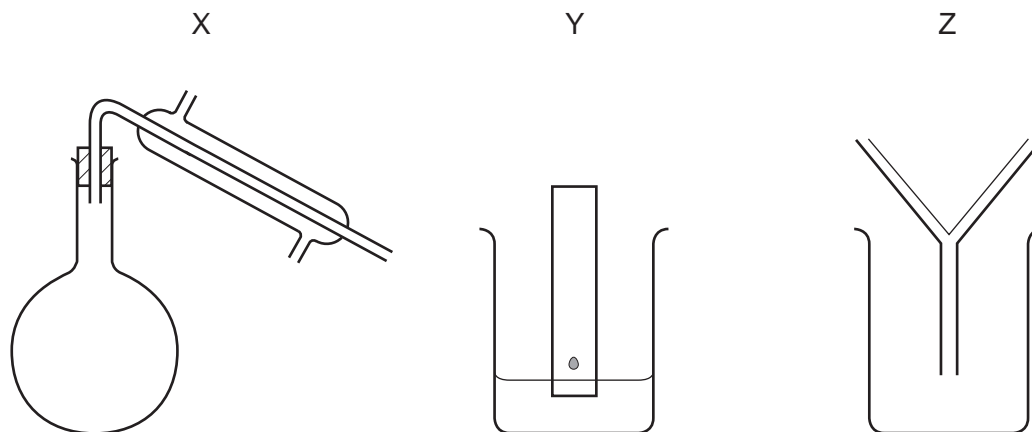
- 2 Part of the instructions in an experiment reads as follows.

Quickly add 50 cm³ of acid.

What is the best piece of apparatus to use?

- A** a burette
- B** a conical flask
- C** a measuring cylinder
- D** a pipette

3 The outline diagrams show three methods of separation.



What are the three methods called?

| | X | Y | Z |
|----------|----------------|----------------|----------------|
| A | chromatography | distillation | filtration |
| B | distillation | chromatography | filtration |
| C | distillation | filtration | chromatography |
| D | filtration | chromatography | distillation |

4 A sample of a drug is analysed by using a chemical test for aspirin and measuring its melting point.

The chemical test is positive but the melting point is 130°C not 135°C as it should be.

What is correct?

| | the sample contains aspirin | the sample has an impurity |
|----------|-----------------------------|----------------------------|
| A | ✓ | ✓ |
| B | ✓ | x |
| C | x | ✓ |
| D | x | x |

- 5 Students are asked to draw a diagram of an atom with symbol ${}^3_1\text{X}$.

Which diagram is correct?

key

- Ⓟ proton
- Ⓝ neutron
- ⓔ electron
- nucleus

- 6 The table describes the structures of four particles.

| particle | number of protons | number of neutrons | number of electrons |
|-----------------|-------------------|--------------------|---------------------|
| O | 8 | 8 | 8 |
| O ²⁻ | 8 | 8 | X |
| Na | 11 | Y | 11 |
| Na ⁺ | 11 | 12 | Z |

What are the correct values of **X**, **Y** and **Z**?

| | X | Y | Z |
|----------|----------|----------|----------|
| A | 9 | 11 | 10 |
| B | 9 | 11 | 11 |
| C | 10 | 12 | 10 |
| D | 10 | 12 | 11 |

- 7 The table shows the electronic structures of four atoms.

| atom | electronic structure |
|------|----------------------|
| W | 2,8,1 |
| X | 2,8,4 |
| Y | 2,8,7 |
| Z | 2,8,8 |

Which two atoms combine to form a covalent compound?

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

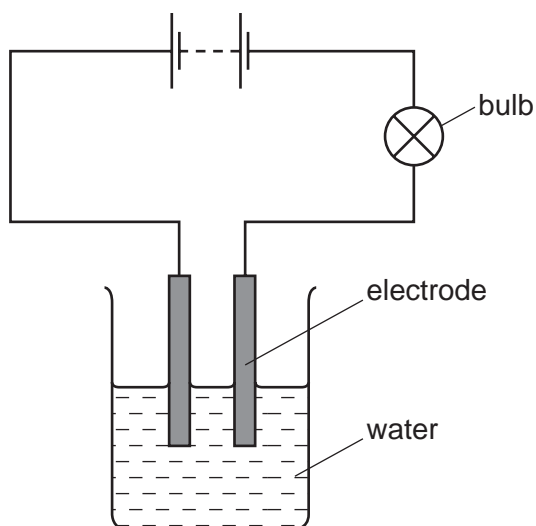
- 8 The following statement is about chemical bonds.

Covalent bonds are formed by the ...1... of electrons. Covalent substances have ...2... electrical conductivity.

Which words complete the statement?

| | 1 | 2 |
|----------|----------|------|
| A | sharing | high |
| B | sharing | low |
| C | transfer | high |
| D | transfer | low |

- 9 A student sets up the apparatus shown. The bulb does not light.



After the student adds substance **X** to the water, the bulb lights.

What could **X** be?

- A** barium sulphate
- B** carbon (or diamond)
- C** copper (or graphite)
- D** potassium sulphate

10 The diagram shows a model of a molecule of an organic acid.



What is the relative molecular mass of this acid?

- A 11 B 40 C 58 D 74

11 For complete combustion, one molecule of an organic compound needs 8 molecules of oxygen.

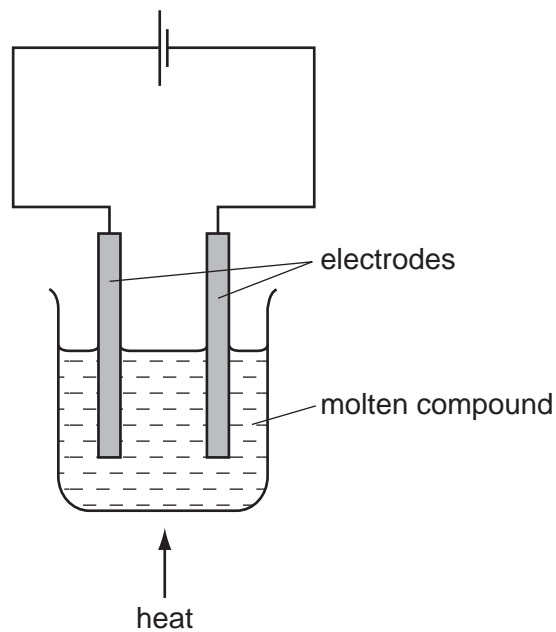
What could the formula of this compound be?

- A $C_5H_{11}OH$
 B C_6H_9OH
 C $C_6H_{11}OH$
 D C_6H_{12}

12 What is the charge on an anode and the type of element formed at such an electrode?

| | charge on anode | type of element formed |
|----------|-----------------|------------------------|
| A | negative | metal |
| B | negative | non-metal |
| C | positive | metal |
| D | positive | non-metal |

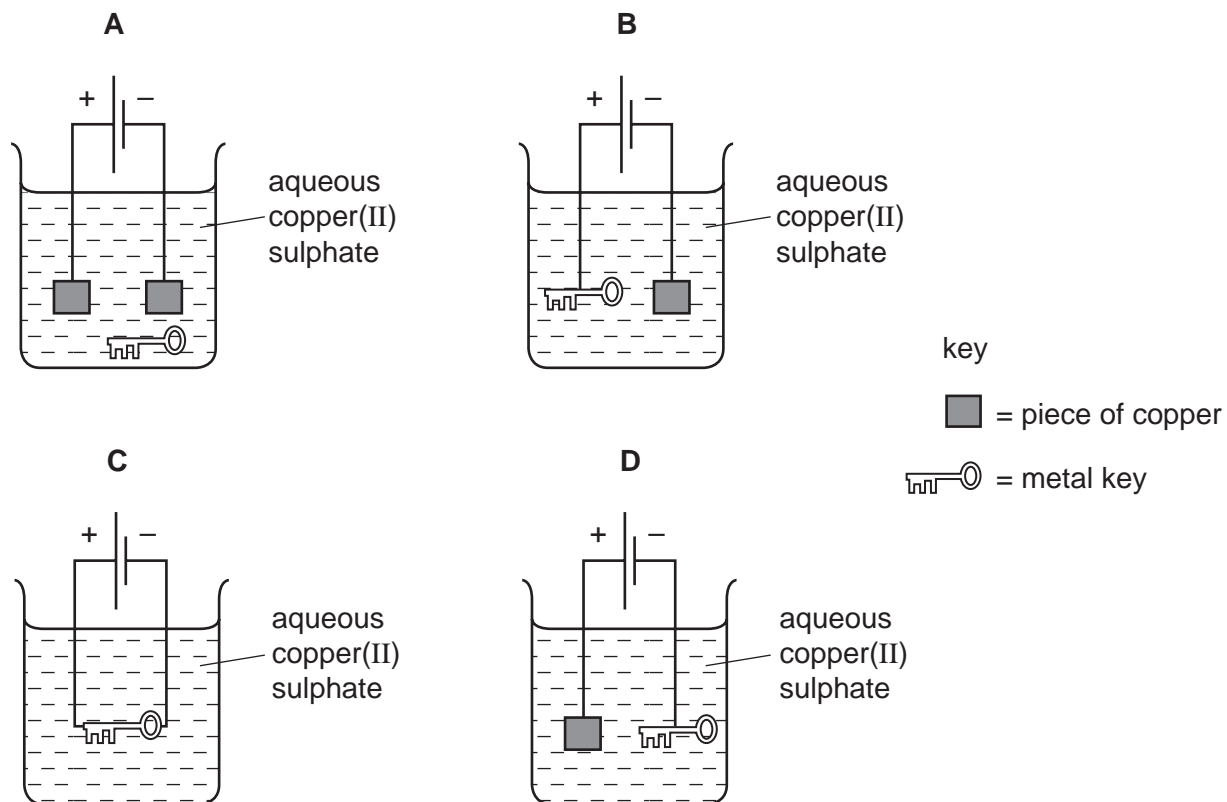
13 The diagram shows how to cause a chemical change in a molten compound.



What is this process used for?

- A extraction of metal from its ore
- B neutralisation of industrial waste
- C production of fertilisers
- D removal of oxides from metals

14 In which set of apparatus is the metal key electroplated with copper?

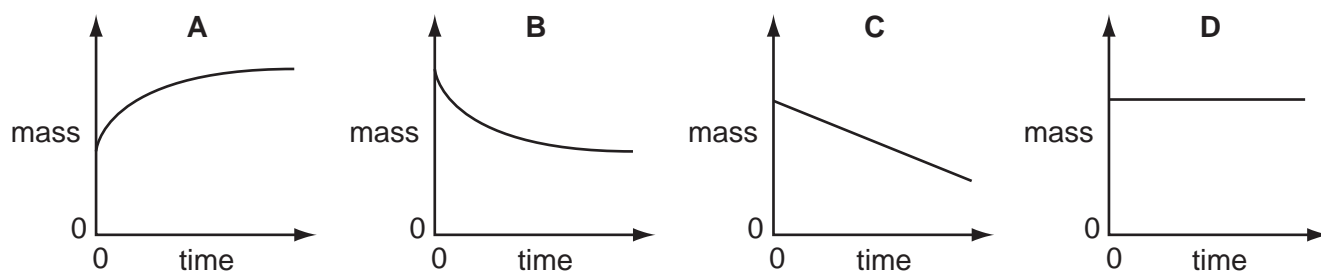


15 Which substance is **not** used as a fuel?

- A ethanol
- B methane
- C oxygen
- D uranium

16 The mass of a beaker and its contents is plotted against time.

Which graph represents what happens when sodium carbonate reacts with an excess of dilute hydrochloric acid in an open beaker?



17 Which changes of condition slow down the reaction between magnesium and air?

- 1 heating the magnesium to a higher temperature
- 2 using a higher proportion of oxygen in the air
- 3 using magnesium ribbon instead of powdered magnesium

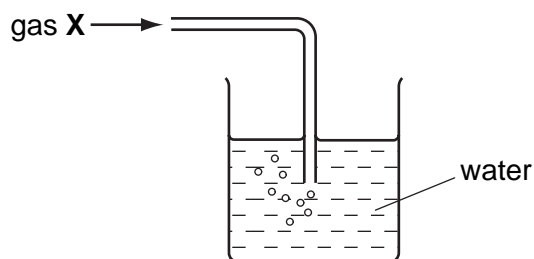
- A 1 only
B 2 only
C 3 only
D 1, 2 and 3

18 Dilute sulphuric acid is added to a mixture of copper, magnesium and zinc in a beaker. The beaker is left for about 10 minutes and its contents are then filtered.

What does the filtrate contain?

- A copper(II) sulphate, magnesium sulphate and zinc sulphate
B copper(II) sulphate and zinc sulphate only
C magnesium sulphate and zinc sulphate only
D magnesium sulphate only

19 Gas X is passed into water as shown.

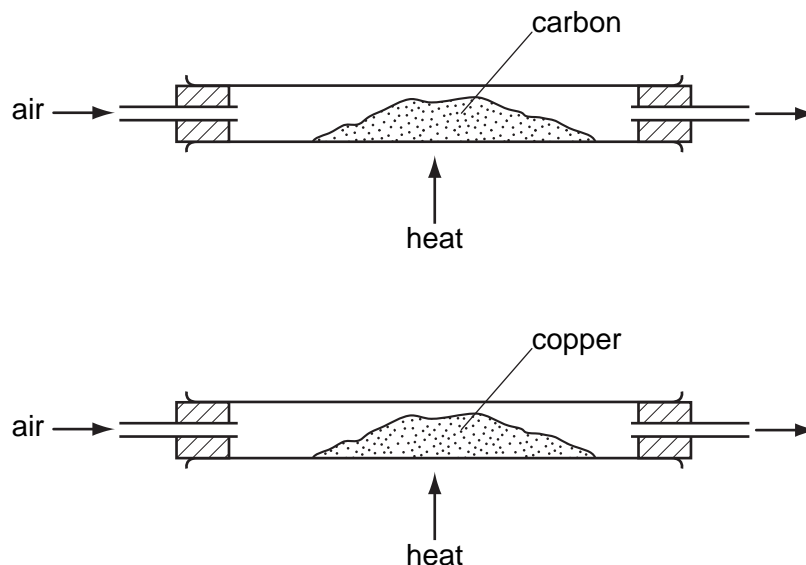


The pH of the water changes from 7 to 10.

What is gas X?

- A ammonia
B carbon dioxide
C nitrogen
D sulphur dioxide

20 Powdered carbon and powdered copper are separately heated as shown.



Which changes in the masses of the powders occur?

| | carbon | copper |
|----------|----------|----------|
| A | decrease | decrease |
| B | decrease | increase |
| C | increase | decrease |
| D | increase | increase |

21 Two tests are carried out on a solution containing both copper(II) sulphate and sodium chloride. A student records results as shown.

| test | reagent | result |
|------|-------------------------|-------------------|
| 1 | aqueous barium chloride | blue precipitate |
| 2 | aqueous silver nitrate | white precipitate |

Which results are correctly recorded?

| | 1 | 2 |
|----------|---|---|
| A | ✓ | ✓ |
| B | ✓ | x |
| C | x | ✓ |
| D | x | x |

- 22 Aqueous solution **S** is added to aqueous ammonium chloride. The mixture is heated. Ammonia gas is given off.

What could solution **S** contain?

- A aluminium
- B ammonium sulphate
- C sodium chloride
- D sodium hydroxide

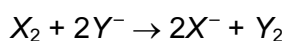
- 23 Rubidium is below potassium in Group I of the Periodic Table.

- The melting point of rubidium is1..... than that of potassium.
- The reaction of rubidium with water is2..... than that of potassium.

Which words correctly complete these statements?

| | 1 | 2 |
|----------|--------|--------|
| A | higher | faster |
| B | higher | slower |
| C | lower | faster |
| D | lower | slower |

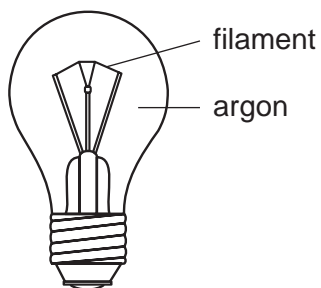
- 24 The equation shows the reaction between a halogen and the aqueous ions of another halogen.



What could X_2 and the colour of Y^- be?

| | X_2 | Y^- |
|----------|----------|------------|
| A | chlorine | brown |
| B | chlorine | colourless |
| C | iodine | brown |
| D | iodine | colourless |

25 The diagram shows a light bulb.



Why is argon used instead of air in the light bulb?

- A Argon is a good conductor of electricity.
- B Argon is more reactive than air.
- C The filament glows more brightly.
- D The filament lasts for a longer time.

26 Element **X** exists as diatomic molecules.

In which group of the Periodic Table is **X** placed?

- A Group 0
- B Group I
- C Group II
- D Group VII

27 Which statement is correct about **all** metals?

- A They are attracted to a magnet.
- B They are weak and brittle.
- C They may be used to form alloys.
- D They react with water.

28 The table gives information about three different metals.

| metal | metal oxide reduced when heated with carbon | reacts with dilute hydrochloric acid |
|-------|---|--------------------------------------|
| X | ✓ | x |
| Y | x | ✓ |
| Z | ✓ | ✓ |

What is the correct order of reactivity of these metals?

| | most reactive | —————▶ | least reactive |
|----------|---------------|--------|----------------|
| A | X | Y | Z |
| B | Y | X | Z |
| C | Y | Z | X |
| D | Z | X | Y |

29 The following statements are about alloys.

- Alloys are ...X....
- ...Y... alloys conduct electricity.

Which words complete the statements?

| | X | Y |
|----------|-----------|------|
| A | compounds | All |
| B | compounds | Some |
| C | mixtures | All |
| D | mixtures | Some |

30 A piece of equipment needs to be made from a metal that is of low density, relatively strong and resistant to corrosion.

Which metal is best suited for this?

- A** aluminium
- B** copper
- C** iron
- D** silver

31 Some elements of the Periodic Table are shown shaded.

Which set of shaded elements could be used with iron to make different types of steel?

The diagram shows a simplified periodic table with shaded elements. The shaded elements are: Group 1 (rows 1-3), Group 2 (rows 1-3), the transition metals (rows 1-3, columns 4-10), Group 11 (row 1, column 11), and Group 12 (row 1, column 12). Labels A, B, C, and D are placed above the shaded regions.

32 Which of the following do **not** use oxygen?

- 1 breathing apparatus in a hospital
- 2 heating a room with an electric fire
- 3 welding apparatus

A 1 only

B 2 only

C 3 only

D 1, 2 and 3

33 Possible methods to prevent the rusting of iron are

- coat with grease,
- plate the iron with zinc,
- paint the iron.

Which of these methods can easily be used to prevent the rusting of an iron girder of a bridge?

| | coating with grease | plating with zinc | painting |
|----------|---------------------|-------------------|----------|
| A | ✓ | ✓ | ✓ |
| B | ✓ | ✓ | x |
| C | x | ✓ | ✓ |
| D | x | x | ✓ |

- 34 To grow roses, a fertiliser containing nitrogen, phosphorus and potassium is needed. For a good yield, the fertiliser should contain a high proportion of potassium.

Which fertiliser is best for roses?

| fertiliser | proportion by mass | | |
|------------|--------------------|----|----|
| | N | P | K |
| A | 29 | 5 | 0 |
| B | 29 | 15 | 5 |
| C | 13 | 13 | 20 |
| D | 9 | 0 | 25 |

- 35 A label on a bottle of spring water gives the following information.

| Contents per litre | |
|--------------------|---------|
| Calcium | 25.0 mg |
| Magnesium | 4.5 mg |
| Potassium | 1.0 mg |
| Sodium | 6.5 mg |
| Hydrogencarbonate | 103 mg |
| Sulphate | 10.5 mg |
| Nitrate | 7.0 mg |
| Chloride | 5.5 mg |

What is the total mass of singly charged positive ions in the water?

- A** 7.5 mg **B** 12.5 mg **C** 29.5 mg **D** 115.5 mg

- 36 When calcium carbonate is heated, compound **X** and a gas are formed.

What is the name of **X** and what is its use?

| | name of X | use of X |
|----------|------------------|--------------------------------------|
| A | lime | to neutralise acid soil |
| B | lime | to provide nutrients for crop growth |
| C | slaked lime | to neutralise acid soil |
| D | slaked lime | to provide nutrients for crop growth |

37 Which statements about **all** polymers are correct?

- 1 They are compounds containing only carbon and hydrogen.
- 2 They are large molecules made from many smaller molecules.
- 3 They occur in nature.

| | 1 | 2 | 3 |
|----------|---|---|---|
| A | ✓ | ✓ | ✓ |
| B | ✓ | ✓ | x |
| C | x | ✓ | x |
| D | x | x | ✓ |

38 Properties of some organic compounds include:

- 1 they burn;
- 2 they dissolve in water;
- 3 they polymerise.

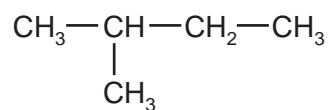
Which of these properties does ethanol have?

| | 1 | 2 | 3 |
|----------|---|---|---|
| A | ✓ | x | ✓ |
| B | ✓ | ✓ | x |
| C | x | ✓ | ✓ |
| D | x | x | ✓ |

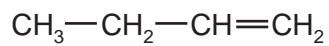
39 Which two molecules contain the same number of hydrogen atoms?

- A** ethane and ethanoic acid
- B** ethane and ethene
- C** ethanoic acid and ethanol
- D** ethanoic acid and ethene

40 The structures of two compounds are shown.



P



Q

Which line in the table is correct?

| | polymerises | reacts readily with bromine |
|----------|-------------|-----------------------------|
| A | P | P |
| B | P | Q |
| C | Q | P |
| D | Q | Q |

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