

## Mock Paper 2

### IGCSE Chemistry

1. A student measures the rate of two reactions. In one reaction, there is a change in mass of the reactants during the reaction. In the second reaction, there is a change in temperature during the reaction. Which piece of apparatus would be essential in both experiments?

A balance

B clock

C pipette

D thermometer

2. Element X has 7 protons. Element Y has 8 more protons than X. Which statement about element Y is correct?

A Y has more electron shells than X.

B Y has more electrons in its outer shell than X.

C Y is in a different group of the Periodic Table from X.

D Y is in the same period of the Periodic Table as X

3. Diamond is extremely hard and does not conduct electricity. Which statement explains these properties?

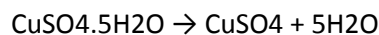
1. A It has a lattice of positive carbon ions in a 'sea of electrons'.

2. B It has delocalised electrons and each carbon atom forms three covalent bonds with other carbon atoms.

3. C It has no delocalised electrons and each carbon atom forms four covalent bonds with other carbon atoms.

4. D It has strong ionic bonds between each carbon atom.

4. Anhydrous copper(II) sulfate can be made by heating hydrated copper(II) sulfate.



What can be added to anhydrous copper(II) sulfate to turn it into hydrated copper(II) sulfate?

A concentrated sulfuric acid

B sodium hydroxide powder

C sulfur dioxide

D water

5. Carbon monoxide burns in oxygen to produce carbon dioxide.  $2\text{CO}(\text{g}) + \text{O}_2(\text{g}) \rightarrow 2\text{CO}_2(\text{g})$

Which mass of carbon dioxide is produced from 14 g of carbon monoxide?

A 22g

B 28g

C 44g

D 88g

6. Element X has six electrons in its outer shell. How could the element react?

A by gaining two electrons to form a positive ion

B by losing six electrons to form a negative ion

C by sharing two electrons with two electrons from another element to form two covalent bonds

D by sharing two electrons with two electrons from another element to form four covalent bonds

7. Calcium, on the left of Period 4 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.

8. Which statement about electrolysis is correct?

A Electrons move through the electrolyte from the cathode to the anode.

B Electrons move towards the cathode in the external circuit.

C Negative ions move towards the anode in the external circuit.

D Positive ions move through the electrolyte towards the anode during electrolysis.

9. Which molecule contains exactly two single covalent bonds?



10. Which part of an atom has a relative mass of 1 and a relative charge of 0?

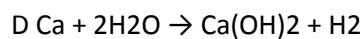
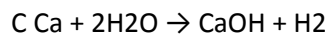
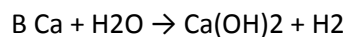
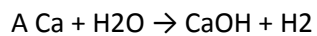
A electron

B neutron

C nucleus

D proton

11. What is the balanced chemical equation for the reaction between calcium and water?



12. Some white anhydrous copper(II) sulfate powder is put into a beaker of water and stirred.

What would show that the process was exothermic?

A A blue solution is formed.

B The beaker feels cooler.

C The beaker feels warmer.

D The powder dissolves in the water.

**13.** What is the relative formula mass of ammonium nitrate,  $\text{NH}_4\text{NO}_3$ ?

- A 80
- B 108
- C 122
- D 150

**14.** Three electrolysis cells are set up. Each cell has inert electrodes. The electrolytes are listed below.

**cell 1** aqueous sodium chloride

**cell 2** dilute sulfuric acid

**cell 3** molten lead(II) bromide

In which of these cells is a gas formed at both electrodes?

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

**15.** The equation shows the formation of anhydrous copper(II) sulfate from hydrated copper(II) sulfate.  $\text{CuSO}_4 \cdot 5\text{H}_2\text{O} \rightarrow \text{CuSO}_4 + 5\text{H}_2\text{O}$  Statements 1, 2 and 3 refer to this reaction.

1 Hydrated copper(II) sulfate is reduced to anhydrous copper(II) sulfate.

2 The (II) in the name copper(II) sulfate refers to the oxidation state of the metal.

3 The reaction is reversible.

Which statements are correct?

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

**16.** Farmers add calcium oxide (lime) and ammonium salts to their fields.

The compounds are not added at the same time because they react with each other.

Which gas is produced in this reaction?

A ammonia

B carbon dioxide

C hydrogen

D nitrogen

**17.** Which air pollutant is not made when coal burns in a power station?

A carbon monoxide

B lead compounds

C nitrogen oxides

D sulfur dioxide

**18.** Calcium carbonate reacts with hydrochloric acid to form carbon dioxide.

Which changes would slow this reaction down?

1 decreasing the concentration of hydrochloric acid

2 decreasing the particle size of calcium carbonate

3 decreasing the temperature

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

**19.** Petroleum is a mixture of hydrocarbons which can be separated into fractions using fractional distillation.

Which fraction is used as fuel in jet engines?

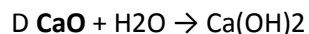
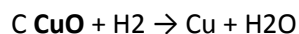
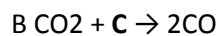
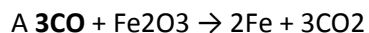
A bitumen

B gasoline

C kerosene

D naphtha

20. The equations represent redox reactions. In which equation is the underlined substance acting as a reducing agent?



21. Ant stings hurt because of the methanoic acid produced by the ant.

Which substance could, most safely, be used to neutralise the acid?

substance	pH
baking soda	8
car battery acid	1
lemon juice	3
oven cleaner	14

22. The diagram shows one period of the Periodic Table.

Li	Be	B	C	N	O	F	Ne
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Which two elements form acidic oxides?

A carbon and lithium

B carbon and neon

C carbon and nitrogen

D nitrogen and neon

23. Which property of elements increases across a period of the Periodic Table?

A metallic character

B number of electron shells

C number of outer shell electrons

D tendency to form positive ions

24. Which element is a transition metal?

colour of chloride	melting point of element/°C
white	113
white	1495
yellow	113
yellow	1495

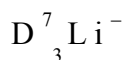
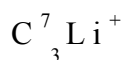
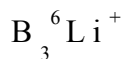
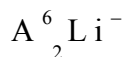
**25.** Group I metals are also known as the Alkali Metals.

Which statement about the metals in Group I is not correct?

- A In their reactions they lose electrons.
- B Their atoms all have one electron in their outer shell.
- C They form +1 ions in their reactions with non-metals.
- D They form covalent compounds by sharing electrons.

**26.** The nucleon number and proton number of the lithium atom are shown by the symbol  ${}^7_3\text{Li}$ .

What is the correct symbol for the lithium ion in lithium chloride?



**27.** Which oxide dissolves in water to form a basic solution?

1. carbon dioxide
2. nitrogen dioxide
3. sodium oxide
4. sulfur dioxide

**28.** Pure metals conduct electricity and can be hammered into different shapes.

Why are metals sometimes used as alloys?

- A Alloys are cheaper than the metals they are made from.
- B Alloys are easier to hammer into different shapes.
- C Alloys are harder and keep their shape better.
- D Alloys conduct electricity better.

**29.** Below are some metals in decreasing order of reactivity.

magnesium

zinc

iron

copper

Titanium reacts with acid and cannot be extracted from its ore by heating with carbon.

Where should titanium be placed in this list?

A below copper

B between iron and copper

C between magnesium and zinc

D between zinc and iron

**30.** In which process is carbon dioxide not formed?

1. burning of natural gas
2. fermentation
3. heating lime
4. respiration

**31.** Nitrogen, phosphorus and potassium are essential elements for plant growth.

Which mixture provides all three essential elements?

Mixture

formula

A ammonium phosphate + potassium chloride

$(\text{NH}_4)_3\text{PO}_4$  +  $\text{KCl}$

B ammonium phosphate + ammonium nitrate

$(\text{NH}_4)_3\text{PO}_4$  +  $\text{NH}_4\text{NO}_3$

C ammonium phosphate + ammonium chloride

$(\text{NH}_4)_3\text{PO}_4$  +  $\text{NH}_4\text{Cl}$

D ammonium nitrate + potassium chloride

$\text{NH}_4\text{NO}_3$  +  $\text{KCl}$

**32.** The list shows four methods that were suggested for the formation of carbon dioxide.



1 action of an alkali on a carbonate

2 action of heat on a carbonate

3 complete combustion of methane

4 reaction of a carbonate with oxygen

Which methods would result in the production of carbon dioxide?

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

**33.** Organic compounds may have names ending in

A-ane,

B-ene,

C -ol or

D -oic acid.

Which of these endings indicate the compounds contain double bonds in their molecules?

**34.** Which of the statements about ethanol are correct?

1 Ethanol can be formed by an addition reaction.

2 Ethanol can be formed by fermentation.

3 When ethanol burns in air, it forms carbon dioxide and water.

A 1, 2 and 3

B 1 and 2

C 1 and 3

D 2 and 3

**35.** When ammonium nitrate is added to water the temperature of the water decreases.

The ammonium nitrate can be recovered by evaporating the water added.

Which explains these observations?

A The ammonium nitrate dissolves in the water and the process is endothermic.

B The ammonium nitrate reacts with the water and the process is endothermic.

C The ammonium nitrate dissolves in the water and the process is exothermic.

D The ammonium nitrate reacts with the water and the process is exothermic.

**36.** Which substance could not be used as a fuel to heat water in a boiler?

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

**37.** Which substance is not a fossil fuel?

- A coal
- B kerosene
- C gasoline
- D wood

**38.** Which compound rapidly decolourises aqueous bromine?

1. ethane
2. ethanoic acid
3. ethanol
4. ethene

**39.** Which statement about aqueous ethanoic acid is not correct?

1. It produces carbon dioxide when it reacts with magnesium carbonate.
2. It produces hydrogen when it reacts with magnesium.
3. It neutralises magnesium oxide.
4. It turns red litmus paper blue.

**40.** Which hydrocarbon reacts with steam to produce ethanol?

- A  $C_2H_4$
- B  $C_2H_6$
- C  $C_3H_6$
- D  $C_4H_{10}$