

SCIENCE

INTERACTIVE ASSESSMENT QUESTIONS BASED ON STANDARD PRACTICAL EXERCISES FOR REVISION AND EXAMINATION PRACTICE

Chemistry Part 2

LEARNING VERSION

IN THIS LEARNING VERSION ANSWERS ARE IMMEDIATELY AND VISIBLY MARKED, CORRECT ANSWERS ARE INDICATED ON REQUEST, AND END OF SECTION TOTALS AND PERCENTAGES SHOWN ON SCREEN.

SOME OF THE MORE DIFFICULT QUESTIONS HAVE DROP DOWN HELP BOXES WHICH REVEAL INFORMATION WHEN THE CURSOR IS PASSED OVER THE QUESTION MARK.

WHEN PRINTED OUT ONLY THE QUESTIONS SHOW, THEREFORE THIS CAN BE USED AS A PAPER VERSION FOR TESTS IF REQUIRED.

The questions are of the Multiple Choice style, where the phrase “Which ONE of the following ...” is implied, but is not always stated. So that students are reminded of the type of question that requires short written answers, which unfortunately cannot be automatically marked, each topic has one short passage with missing words, which must be identified in their correct sequence.

NB The practical work presented should be familiar to students, either as demonstrations or as procedures they might have carried out themselves in the lab.

The material is NOT presented as a practical guide, and while the methods followed safety guidelines, specific safety issues are NOT dealt with. Visit www.cleapps.org.uk

CONTENTS

The following practical topics have been selected according to exam question frequency to form the basis of revision and examination practice.

FOR THE CORRECT FINAL TOTAL AND PERCENTAGE THE ENTER BUTTON AT THE BOTTOM LEFT OF EACH PAGE MUST BE CLICKED ON.

Part 1

Reactivity series

Displacement

Alkali metals

Part 2

Neutralisation

Rate of reaction

Electrolysis

Part 3

Hydrocarbons and fractional distillation

Cracking hydrocarbons

Bromine water test

● Neutralisation

HELP BOX

PASS CURSOR OVER
QUESTION MARK
FOR HELP WITH
QUESTIONS
2 & 3



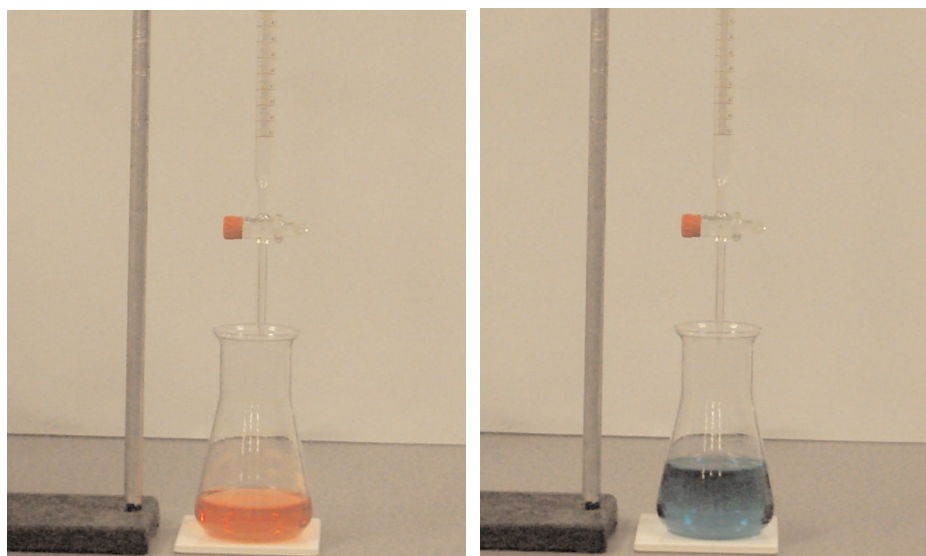
An indicator is a solution that changes colour as the acidity/alkalinity of a solution changes.

Universal Indicator

ALKALINE Purple
Blue
Green
NEUTRAL Yellow
Orange
ACIDIC Red

Neutralisation is the process by which acidic solutions and alkaline solutions are made neutral (neither acidic nor alkaline). Acidic solutions and alkaline solutions neutralise each other.

Practical - In this experiment sodium hydroxide solution was run into hydrochloric acid in a conical flask. The hydrochloric acid in the flask contained Universal Indicator solution. The flask was photographed at the start and at the end of the experiment.



1. Which one of the following is the correct name for the type of reaction shown above?

- A - Reduction reaction.
- B - Thermal decomposition reaction.
- C - Addition reaction.
- D - Neutralisation reaction.

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2. If excess sodium hydroxide solution was added to the liquid in the conical flask, what colour would it become?

- A - Red.
- B - Purple.
- C - Green.
- D - Yellow.

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3. When the indicator changes to yellow green, which one of the following best describes the state of the solution in the flask?

- A - It is alkaline
- B - It is acidic
- C - It is neutral
- D - It is more concentrated

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● Neutralisation

4. In the experiment shown previously sodium hydroxide solution - an alkali, was added to hydrochloric acid. Which of the following combination of products is produced by the reaction?

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- A** - Salt + sodium.
- B** - Salt + hydrogen.
- C** - Salt + chlorine.
- D** - Salt + water.

5. From the list below correctly identify the salt that is formed during the above reaction.

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- A** - Potassium Sulphate
- B** - Potassium Chloride
- C** - Sodium Sulphate
- D** - Sodium Chloride

6. The solution produced as a result of the reaction described above would be acidic if it contained an excess of which one of the following:

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- A** - OH^- ions
- B** - H^+ ions
- C** - Na^+ ions
- D** - Cl^- ions

● Neutralisation

7. Which one of the following list of reactants would be used to produce calcium nitrate?

- A** - Sodium hydroxide + Nitric acid
B - Calcium chloride + Nitric acid
C - Calcium hydroxide + Nitric acid
D - Sodium chloride + Nitric acid

8. The following passage has four missing words.

In the reactions described previously an alkali has been added to an acid to produce a salt plus water. The resulting salt is named according to the ___ and the metal part of the ___. If magnesium hydroxide was added to sulphuric acid the salt produced would be called ___ ___.

Which of the following has the correct missing words in the sequence as they should appear in the passage.

- A** - alkali - acid - magnesium - sulphate
B - acid - alkali - magnesium - sulphate
C - acid - alkali - magnesium - nitrate
D - acid - alkali - magnesium - phosphate

● Rate of reaction

The rate of a chemical reaction can be measured in different ways, and varies with changing conditions.

Practical - In this experiment a flask containing 10g of marble chips (mainly calcium carbonate) was plugged with cotton wool and placed on a digital balance and the mass recorded. The cotton wool plug was then carefully removed, a known volume of dilute hydrochloric acid added, and the plug replaced immediately. The mass registered on the balance was recorded at 10 second intervals. The experiment shown below was carried out at room temperature, which was constant at 20°C.

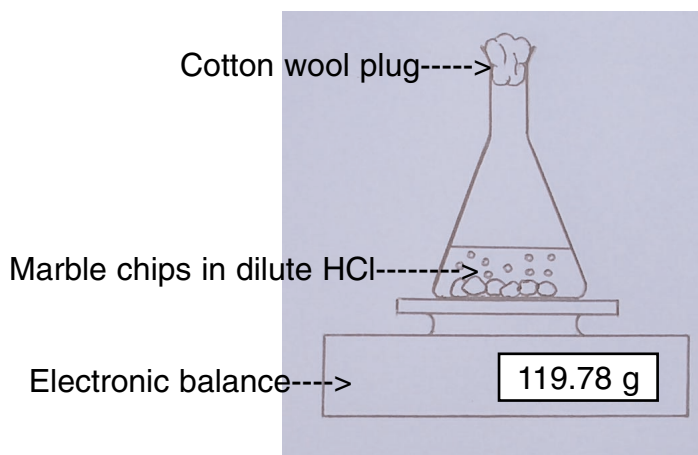


Table of balance readings at 10 second intervals in grammes

T/secs	grammes
0	119.78
10	119.65
20	119.58
30	119.51
40	119.46
50	119.41

9. Study the results recorded in the table above, and select which one of the following statements best agrees with your observations.

- A** - There is a gain in mass.
- B** - The mass remains constant.
- C** - There is a loss of mass at a constant rate.
- D** - There is a loss of mass at a decreasing rate.

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10. Which of the statements below is the best explanation of the changing mass?

- A** - Water is evaporating.
- B** - Water is condensing.
- C** - Gas is escaping.
- D** - The calcium carbonate is reacting.

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11. Which of the statements below is the best explanation of why the reaction would eventually stop?

- A** - The gas bubbles all escape.
- B** - The hydrochloric acid becomes unreactive.
- C** - The hydrochloric acid becomes too concentrated.
- D** - The marble chips are eventually used up in the reaction.

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● Rate of reaction

Practical - The experiment was repeated with marble chips ground down into a fine powder, and the results recorded as in the previous experiment.

Powdered marble chips

Table of balance readings at 10 second intervals in grammes

T/secs	grammes
0	119.78
10	119.54
20	119.47
30	119.43
40	119.40
50	119.38

Marble chips in previous experiment

Table of balance readings at 10 second intervals in grammes

T/secs	grammes
0	119.78
10	119.65
20	119.58
30	119.51
40	119.46
50	119.41

12. Compare the two sets of results and choose one of the following statements that best explains your observations.

- A** - The increased surface area of the powdered marble chips increased the rate of reaction.
- B** - The decreased surface area of the powdered marble chips increased the rate of reaction.
- C** - The increased surface area of the powdered marble chips decreased the rate of reaction.
- D** - The decreased surface area of the powdered marble chips decreased the rate of reaction.

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13. Which one of the changes listed below do you think would increase the rate of reaction of this experiment?

- A** - A decrease in temperature.
- B** - An increase in temperature.
- C** - Using an increased volume of dilute hydrochloric acid.
- D** - Using a smaller mass of calcium carbonate.

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14. Which one of the following shows the correct products for this reaction?

- A** - Calcium chloride + Carbon dioxide + Water
- B** - Calcium chloride + Carbon monoxide + Water
- C** - Calcium hydroxide + Carbon dioxide + Water
- D** - Calcium + Carbon dioxide + Water

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Electrolysis

HELP BOX

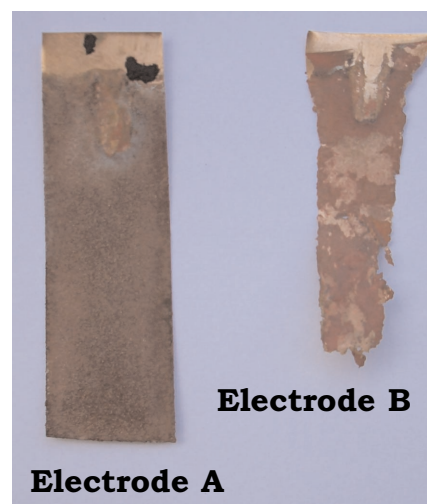
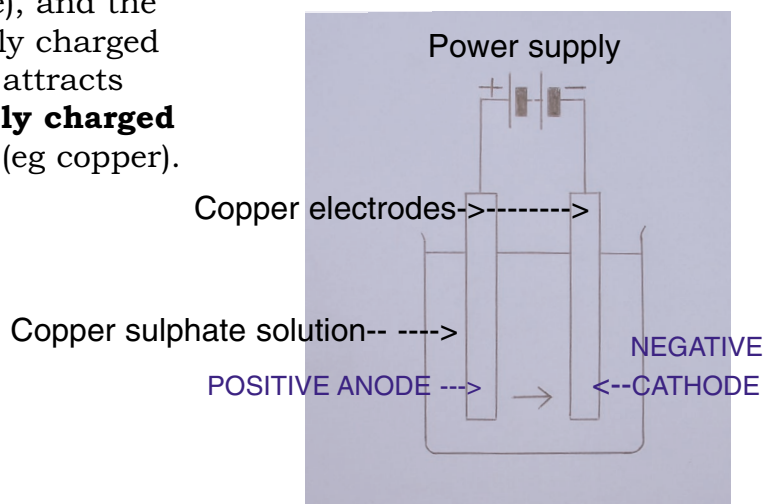
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QUESTIONS
15 & 16



The positive anode attracts **negatively charged anions** (eg sulphate), and the negatively charged cathode attracts **positively charged cations** (eg copper).

When a direct electric current is passed between two electrodes (the **positive anode** and the **negative cathode**) through a solution containing ions (electrically charged particles) chemical changes occur at the electrodes. This is known as **electrolysis**.

Practical - The diagram shows the electrolysis of copper sulphate solution using copper electrodes. In this practical, copper is removed from one electrode and deposited on the other electrode, so that the mass of both electrodes changes. The photograph below right shows the two electrodes after the experiment has run for some time.



15. Which one of the following best describes what happens to the copper electrodes in the experiment above?

- A** - The anode gains mass and the cathode gains mass.
- B** - The anode gains mass and the cathode loses mass.
- C** - The anode loses mass and the cathode gains mass.
- D** - The anode loses mass and the cathode loses mass.

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16. Which one of the following is the best explanation of the appearance of the two electrodes?

- A** - Electrode A is the cathode and has gained sulphate ions.
- B** - Electrode A is the cathode and has gained copper.
- C** - Electrode B is the cathode and has lost copper.
- D** - Electrode B is the anode and has lost sulphate ions.

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● Electrolysis

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17. Which one of the following is extracted using electrolysis?

- A - Highly reactive metals.
- B - Unreactive metals.
- C - Metals with low reactivity.
- D - All metals.

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18. Which one of the following metals is extracted commercially using electrolysis?

- A - Iron
- B - Gold
- C - Silver
- D - Aluminium

HELP BOX

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QUESTION
NUMBER 19



With regard to the loss or gain of electrons, remember the term:

OIL RIG

Oxidation Is LOSS of electrons.

Reduction Is GAIN of electrons.

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19. The following passage has four missing words.

When a solution undergoes electrolysis anions are attracted to the anode. Here the anions ____ their extra electrons which travel around the circuit. At the negatively charged cathode the cations ____ electrons. Therefore the type of reaction at the anode is known as ____, and at the cathode is known as ____.

Which of the following has the correct missing words in the sequence as they should appear in the passage.

- A - gain - release - reduction - oxidation.
- B - release - gain - reduction - oxidation.
- C - gain - release - oxidation - reduction.
- D - release - gain - oxidation - reduction.

- Neutralisation

- Rate of reaction

- Electrolysis

SECTION TOTAL**SECTION PERCENTAGE**