

A. Extracting Metals – The reactivity Series, Metal Oxides, Extracting Metals by Reduction

1. What is an ore?
2. What is produced when metals react with oxygen?
3. What is this process called and why?
4. What is reduction in terms of oxygen?
5. What type of ions do metals produce?
6. Which is more reactive potassium or iron?
7. Which two non-metals can be included in the reactivity series?
8. Why is gold found as an element in the Earth?
9. How are metals, less reactive than carbon, extracted from their ores?
10. HT: Describe oxidation in terms of electrons.
11. HT: Describe reduction in terms of electrons.
12. Write the word equation for the reaction between lithium and water.
13. Write the balanced symbol equation for the reaction between lithium and water.
14. HT: Zinc oxide can be extracted from zinc oxide by heating it with carbon in the blast furnace. Carbon monoxide is also produced. Which reactant is:
 - a) Oxidised?
 - b) Reduced?

B. Reactions of Acids – part 1 – Metals and Acids, Neutralisation of acids to produce salts, soluble salts

1. What is produced when acids react with metals?
2. HT: What is a redox reaction?
3. What is produced when an acid reacts with a carbonate?
4. What salt is produced by the following acids?
 - a. Hydrochloric acid
 - b. Sulfuric acid
 - c. Nitric acid

5. How are soluble salts made from acids and insoluble substances?
6. Name the process of producing solid salts from salt solution.
7. Complete the following equations:
 - a) Magnesium + sulfuric acid \longrightarrow
 - b) Sodium hydroxide + hydrochloric acid \longrightarrow
 - c) Lithium carbonate + nitric acid \longrightarrow
8. Write a balanced symbol equation, with state symbols, for the reaction between zinc and hydrochloric acid.
9. **HT Only:** Write an ionic equation, with state symbols, to show magnesium reacting with hydrochloric acid.

C. Reactions of Acids – part 2 – pH and Neutralisation, Salts and Titration

1. What ions do aqueous acids contain?
2. What ions do aqueous alkalis contain?
3. What is the pH scale?
4. How can pH be measured?
5. What pH is a neutral solution?
6. What pH do aqueous acid solutions have?
7. What pH do aqueous alkali solutions have?
8. Write a balanced symbol equation for the reaction between hydrogen ions and hydroxide ions.
9. **CHEMISTRY ONLY:** What are the units for the concentration of a solution?
10. **CHEMISTRY ONLY:** What is the concentration of a solution that has 40g of solute in 2dm³ of solution?
11. **HT Only:** What is a strong acid?
12. **HT Only:** Name 3 strong acids.
13. **HT Only:** What is a weak acid?
14. **HT Only:** Name 3 weak acids.

15. **HT Only:** What is a dilute acid?
16. **HT Only:** What happens to the hydrogen ion concentration as the pH decreases by 1?

D. Electrolysis – part 1 – molten ionic compound, aqueous solution

1. Why can a molten or dissolved ionic compound conduct electricity?
2. What is electrolysis?
3. What is the name of the electrode that positive ions move to?
4. What is the name of the electrode that the negative ions move to?
5. What is produced at the cathode when lead bromide is electrolysed?
6. What is produced at the anode when lead bromide is electrolysed?
7. What is produced at the cathode if the metal in the solution is more reactive than hydrogen?
8. What is produced at the anode if the solution does not contain halide ions?
9. **HT Only:** Write half equations for the reactions that happen at the electrodes during the electrolysis of molten copper chloride.
10. Predict the products of electrolysis of copper sulfate solution
11. **HT Only:** Write a half equation for the reactions that happen at the electrodes during the electrolysis of copper bromide solution.

E. Electrolysis – part 2 – extracting metals

1. Why is electrolysis used to extract aluminium from its ore?
2. Why is electrolysis an expensive way to extract metal from its ore?
3. Name the compound from which aluminium is extracted.
4. What is this compound dissolved in before electrolysis?
5. What is the anode made of?
6. Describe what happens at the positive electrode during the electrolysis of aluminium oxide.
7. **HT Only:** Write half equations for the reactions that occur at the positive and negative electrodes during the production of aluminium.