S2 Learning Outcomes

Introduction

1 State that an atom is the smallest kind of particle.

2 State that a molecule is a cluster of atoms bonded together.

3 State that an element contains only one kind of atom.

4 State that a compound contains different kinds of atoms bonded together.

Water

5 State that Hydrogen burns with a 'pop' and is lighter than air.

6 State that Water is formed when Hydrogen burns in air.

7 State that Water is a compound consisting of Hydrogen and Oxygen.

8 State that energy is given out when Hydrogen reacts with Oxygen to form Water.

9 State that Water can be decomposed into Hydrogen and Oxygen by adding energy.

10 Describe how Water can be decomposed into Hydrogen and Oxygen by electrolysis of a solution containing Sodium fluoride.

11 State that the volume of Hydrogen produced by the electrolysis of Water is twice the volume of Oxygen.

Three Types of Solution

12 State that, in a neutral solution, pH = 7

13 State that, in an acid, pH < 7

14 State that, in an alkali, pH > 7

15 State that pH measures whether a solution is neutral, acidic or alkaline.

16 Use pH paper to measure the pH of a given solution or of a given substance in solution.

17 State that there are various strengths of acids and alkalis distinguishable by their pH.

18 State the approximate pH of baking soda solution, vinegar, milk of magnesia, Potassium hydroxide solution, lime solution, Sodium carbonate solution, lemon juice and Sodium chloride solution.

Action of Metals on Water

19 Explain why all metals are covered by an oxide layer.

20 Write a word equation for the reaction of any metal with Oxygen.

21 Explain why very reactive metals must be stored under oil.

22 Write a word equation for the reaction of a metal with Water.

23 Explain that an alkali is formed when a metal reacts with Water.

24 Describe the reactions of Potassium, Sodium, Lithium, Calcium andMagnesium with Water.

25 State that there is a reactivity series of metals.

26 State that all metals below Hydrogen in the reactivity series do not react with Water.

Action of Metals on Acids

27 Write a word equation for the reaction of a metal with Hydrochloric acid.

28 Write a word equation for the reaction of a metal with Sulphuric acid.

29 State that all acids contain Hydrogen which is more easily displaced by metals than the Hydrogen in Water.

30 Describe the reaction of Magnesium, Zinc and Iron with both Hydrochloric and Sulphuric acids.

31 State that the reactivity order is the same irrespective of the acid used.

32 State that all metals below Hydrogen in the reactivity series do not displace Hydrogen from acids.

33 State that the product formed when the Hydrogen in an acid is replaced by a metal is called a Salt.

34 Describe the preparation of a salt by reaction of a metal with both Hydrochloric and Sulphuric acids.

Neutralisation

35 State that neutralisation is the reaction of an acid with an alkali to give a neutral solution.

36 Describe the neutralisation of Sodium hydroxide solution by Hydrochloric acid.

37 Describe the neutralisation of Potassium hydroxide solution by Nitric acid.

38 Describe the use of an indicator in a neutralisation experiment.

39 Write a word equation for the reaction of Hydrochloric acid with Sodium hydroxide.

40 Write a word equation for the reaction of Nitric acid with Potassium hydroxide.

Applications of Neutralisation

41 State five applications of neutralisation.
To include baking soda on a bee sting, vinegar on a wasp sting, milk of magnesia for indigestion, lime on acid soils and Sodium carbonate on acid spills.

The Earth

42 Draw a cross section of the Earth showing the inner core, outer core, mantle and crust.

43 Explain how igneous, sedimentary and metamorphic rocks were formed.

44 State that crystal sizes in igneous rocks depend on rate of cooling.

Naturally Occurring Elements

45 State five elements which occur uncombined in nature.

46 Explain why certain elements occur uncombined (to include low reactivity and renewal)

47 Write word equations for the reaction of metals with Sulphur.

48 Describe an experiment to react metals with Sulphur.

49 Memorise the following reactivity order :
Potassium, Sodium, Lithium, Calcium, Magnesium, Zinc, Iron, Hydrogen, Copper, Mercury, Silver, Gold and Platinum.

50 State that carbonates are formed by the reaction of metals on Carbonic acid.

51 State that acid releases Carbon dioxide from all carbonates.

Obtaining Metals from their Ores

52 Explain why the ease of obtaining metals from their ores depends on their reactivity.

53 Write word equations for the action of heat on the oxides of Mercury, Silver, Gold and Platinum.

54 Write word equations for the reaction of metal sulphides with Oxygen.

55 Write word equations for the action of heat on metal carbonates.

56 Describe experiments to investigate the action of heat on metal oxides, sulphides and carbonates.

57 Describe tests for Oxygen (glowing splint), Sulphur dioxide (Iodine) and Carbon dioxide (Limewater).

58 Write word equations for the reaction of metal oxides with Carbon.

59 Describe an experiment to prepare Lead and Copper from their oxides by heating with Carbon.

Investigation of Malachite

60 State the flame test colours for Sodium, Calcium, Copper and Potassium.

61 Identify an unknown compound given its flame test and its reaction with acid and/or heat. To include Malachite.

Silicates

62 Explain that silicates are unreactive because they contain very strong Silicon - Oxygen bonds.

The Sea

63 Describe how a sample of salt can be obtained from sea water.

64 Describe how salt can be shown to contain Sodium (by flame test) and Chlorine (by electrolysis).

65 State that salt is Sodium chloride.

The Gases in the Atmosphere

66 Describe an experiment to show that air is 1/5 Oxygen by burning Magnesium in a bell jar.

67 Describe an experiment to show that the air contains Carbon dioxide.

68 Describe an experiment to show that the air contains Water vapour.

69 State that air has the following composition : Nitrogen (78%), Oxygen (21%), Argon (1%), Carbon dioxide (trace) and Water (trace).

The Moon

70 State that the moon has no atmosphere.

71 State THREE features of lunar rocks which are the direct result of the lack of an atmosphere. To include no hydroxides, carbonates and fossils.

Copper and its Compounds

72 Describe how to prepare Copper sulphate from Copper oxide.

73 State that 'Water of Crystallisation' is water trapped inside the crystal during its growth.

74 Describe how to test a substance to see if it contains water of crystallisation.

75 Describe the effects of heat on Copper sulphate, Magnesium sulphate, Potassium nitrate and Cobalt chloride.

76 Describe how to obtain Copper from Copper sulphate by electrolysis and displacement.