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SPECA

GCSE Combined Science (AQA Trilogy) · Chemistry

Atomic Structure and the Periodic Table · Tiered Worksheet

Section A: Foundation

Atoms, elements, compounds and mixtures

1) Define what is meant by an element. [1]

2) State two ways in which a compound differs from a mixture of the same substances. [2]

3) A mixture contains salt dissolved in water. Name the technique that would separate the salt out as a solid, and explain how it works. [2]

4) Name the separation technique used to obtain pure water from salt water, where the water itself is collected as the product. [1]

5) A mixture of two miscible liquids with different boiling points needs to be separated into its pure components. Name the appropriate technique. [1]

6) Name the technique used to separate the different coloured dyes in a mixture of food colourings, and state what can be compared to identify an unknown dye. [2]

The history of the atom

7) Describe the "plum pudding" model of the atom. [2]

8) The alpha particle scattering experiment produced two key observations. State one of these observations, and explain what it showed about atomic structure. [2]

9) Put the following atomic models in the correct historical order: nuclear model, Bohr model, plum pudding model, solid sphere model. [2]

10) State which was discovered or proposed first: the proton, or Chadwick's evidence for the neutron. [1]

Subatomic particles and isotopes

11) State the relative charge and relative mass of a proton, a neutron, and an electron. [3]

12) An atom of aluminium has an atomic number of 13 and a mass number of 27. State the number of protons, neutrons, and electrons in this atom. [3]

13) Define the term isotope. [2]

14) Copper has two isotopes: copper-63 (69% abundance) and copper-65 (31% abundance). Calculate the relative atomic mass of copper, giving your answer to one decimal place. [3]

15) Give the electronic structure of a phosphorus atom (atomic number 15). [2]

The periodic table and groups

16) Explain why elements in the same group of the periodic table share similar chemical properties. [2]

17) State two ways in which Mendeleev's periodic table differed from a table ordered strictly by atomic weight. [2]

18) Name the group in the periodic table that contains unreactive elements with stable, full outer electron shells. [1]

19) Explain why reactivity increases going down Group 1, but decreases going down Group 7. [3]

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20) Describe the trend in boiling point going down Group 0, and state what causes this trend. **[2]**

21) Bromine solution is added to a solution of potassium iodide. State what would be observed, and explain why this reaction happens. **[2]**

Section B: Higher (in addition to Section A)

Half equations and ionic equations for halogen displacement

22) Chlorine gas is bubbled through an aqueous solution of potassium bromide, producing potassium chloride and bromine. Write a balanced symbol equation for this reaction. **[2]**

23) Write the ionic equation for the reaction in Q22, showing only the ions that actually change during the reaction. **[2]**

24) Write two half equations to show the electron transfer taking place in the reaction in Q22: one for the bromide ions, and one for the chlorine molecules. **[2]**

25) Using your answer to Q24, state which species loses electrons in this reaction, and which species gains electrons. **[2]**

26) Bromine solution is added to potassium iodide solution, displacing iodine. Write a balanced symbol equation, and then the ionic equation, for this reaction. **[3]**

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