

A. Atoms, Elements, Compounds and Mixtures part 1 – Atoms, Elements, Compounds, Word and Symbol Equations

1. Describe the differences between an element and a compound. (2)

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2. Explain what information can be deduced from the chemical formula of carbon dioxide CO₂. (2)

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3. Sodium reacts with water to make sodium hydroxide, NaOH. Write a balanced symbol equation including the state symbols for the reaction. (2)

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B. Atoms, Elements, Compounds and Mixtures part 2 – Separating Techniques

1. What is a mixture? (2)

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2. Explain how the process of distillation can be used to remove dissolved impurities from a sample of water. (4)

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3. **Extended response question:**

Sulfur is soluble in the flammable liquid xylene but not in water. Sodium nitrate is soluble in water but not xylene. Describe and explain two ways to separate a mixture of sulfur powder and sodium nitrate to collect pure samples of each solid. (6)

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4. A mixture of inks is thought to contain three pure inks. The colours of these inks are red, green and blue. Describe using a diagram how a student could prove this. (4)

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C. Atomic Model part 1 – History of the Atom

1. Describe JJ. Thomson’s plum pudding model of the atom (2)

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2. State two ways in which Rutherford changed Thomson’s model of the atom (3)

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3. Explain how Niels Bohr revised Rutherford’s model of the atom. (2)

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D. Atomic Model part 2 – Size and Mass of Atoms and Atomic Structure

1. Explain how to calculate the numbers of protons, neutrons and electrons in an atom. (3)

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2. Explain the overall charge on any atom. (2)

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3. Explain how an atom can become an ion with a 2+ charge. (2)

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4. Describe the differences in the atomic structures of a hydrogen atom and a helium atom (3).
(Hydrogen has a mass number of 1 and atomic number of 1 and helium has a mass number of 4 and a mass number of 2).

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5. Explain why isotopes of the same element have identical chemical properties. (2)

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6. There are two principal stable isotopes of chlorine - ^{35}Cl and ^{37}Cl . The relative atomic mass of chlorine is 35.5. Explain what this shows about the abundance of the two isotopes. (2)

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E. Periodic Table part 1 – History of the Periodic Table

1. Explain how Dmitri Mendeleev constructed his periodic table. (2)

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2. Explain how the scientific community were influenced to accept Dmitri Mendeleev's version of the periodic table (4).

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3. Explain how the position of an element in the periodic table is related to the arrangement of electrons in its atoms. (2)

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4. Explain why elements in many groups of the periodic table have similar chemical properties. (1)

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F. Periodic Table part 2 – Group 0, group 1 and group 7

1. Explain why the Noble gases have stable electronic arrangements. (1)

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2. **Extended response question:**

Place the halogens including Astatine, in order of reactivity, with the most reactive element first. Explain your answer, making sure you include the trend in reactivity and how the reactivity can be explained, referring to halide ions. (6)

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3. Caesium is near the bottom of Group 1 in the periodic table. What do you think will happen if it was dropped into water containing universal indicator solution? Explain what you would observe (5)

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G. Periodic Table part 3 – Transition Metals Chemistry only

1. Describe the chemical and physical differences of the transition metals compared with Group 1. (4)

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2. Give two examples of why transition metals are useful as catalysts. (2)

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