

UNIT 1 REVISION CHECKLIST

Topic 1.1

Can you

- a) define atomic number, mass number, isotopes, relative atomic mass, relative molecular mass
- b) remember the four stages in mass spectrometry and explain how each one works
- c) calculate relative atomic mass from isotopic composition data, or from a mass spectrum of an atom
- d) deduce relative molecular mass from the mass spectrum of a molecule
- e) Give the electronic configuration of atoms with atomic number 1-36 and of the common ions of elements 1 - 18
- f) Define 1st, 2nd ionisation energy
- g) Explain trends in 1st IE across period (general increase, decrease from Be to B, decrease from N to O) and down group
- h) Explain trends in successive ionisation energies
- i) Explain why isotopes have similar chemical properties

Topic 1.2

Can you:

- a) recall the formulae of simple cations and anions from the name
- b) write balanced chemical equations given all the reactants and products in words
- c) interconvert the units of mass (mg, g, kg, tonnes) and volume (cm^3 , dm^3 , m^3)
- d) recall and apply the relationship between mass, molar mass and number of moles
- e) deduce reacting masses and how much of one substance can be obtained from a given mass of another
- f) state the ideal gas equation and use it to relate gaseous volume to number of moles
- g) deduce the number of particles from the number of moles and vice versa from Avogadro's number
- h) recall and apply the relationship between number of moles, volume, concentration (mol dm^{-3} and g dm^{-3}) of solutions
- i) deduce empirical and molecular formula from suitable data

Topic 1.3

Can you:

- a) define an ionic bond, covalent bond, metallic bond, and predict the type of bonding present in simple substances
- b) explain the difference between normal and dative covalent bonds
- c) define electronegativity and use it to explain why some bonds are covalent, others polar covalent and others ionic
- d) draw dot-cross diagrams to show ionic and covalent bonding
- e) explain the processes taking place when a solid is heated until it melts and then boils
- f) explain the existence of four different types of substance - ionic, metallic, molecular and macromolecular - and the different properties of these structures (mpt, bpt, electrical conductivity) – using diamond, graphite, iodine, sodium chloride, magnesium and ice as specific examples
- g) predict and explain the shapes of simple molecules, giant covalent structures and ions using the electron pair repulsion theory, limited to 2, 3, 4, 5 and 6 electron pairs
- h) predict whether or not a molecule will be polar, and hence deduce the type of intermolecular force acting between the molecules
- i) use intermolecular forces to explain trend in boiling point of simple molecular substances

Topic 1.4

Can you:

- a) Define s-block, p-block, d-block elements
- b) Explain trends in size, ionisation energy and electronegativity in period 3 and group II
- c) Predict trends in melting and boiling point of elements in period 3 and group II and explain using the structure and bonding in the elements
- d) Predict and explain trends in electrical conductivity in period 3

Topic 1.5

Can you:

- Draw displayed formulae and write clear structural formulae for alkanes, alkenes and haloalkanes, containing up to six carbon atoms
- Name simple alkanes, alkenes and haloalkanes, containing up to six carbon atoms
- Explain the terms empirical formula, molecular formula, homologous series and functional group, and be able to identify the functional group from the molecular formula.
- Explain the term isomerism, distinguish between positional, chain and functional isomerism, draw all possible isomers of alkanes, alkenes and haloalkanes for molecules with up to four carbon atoms, and recognise isomerism in larger molecules.

Topic 1.6

Can you:

- Explain what crude oil is, how fractional distillation works and why it is necessary.
- Know the names of the major fractions, and their main uses.
- Explain how cracking works and why it is necessary, distinguish between thermal and catalytic cracking and know the conditions, products and uses for both types of cracking.
- Be able to write equations for the complete and incomplete combustion of hydrocarbons, account for the formation of the oxides of nitrogen and sulphur, identify the main pollutants and know the specific problem associated with each.
- Explain the role of catalytic converters in reducing pollution.

If you can do all these things, you'll get an A!