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Isotopes are easy to recognize from their notation as they have the same symbol but different mass numbers. For example, the two stable isotopes of copper are ⁶³Cu and ⁶⁵CuPage 2 This question is about the structure of atoms. Atoms: The Building Blocks of Matter The Dimensions of the Atom Symbol EquationsBalancing Equations Electroplating is used to coat a cheap metal with a thin layer of an expensive metal. Figure 1 shows a metal fork being electroplated in a solution of silver nitrate, AgNO₃. Figure 1 Silver nitrate, AgNO₃ contains silver ions (Ag⁺) and nitrate ions (NO₃⁻). Half Equations & Ionic Equations This question is about separating mixtures. CrystallisationSimple DistillationPaper Chromatography A student filters a mixture using the apparatus shown in Figure 1. Figure 1 This question is about the history and development of models of the atom. Atoms & Scientific Models The Plum Pudding ModelThe Discovery of the NeutronThe Bohr Model Table 1 shows information about two isotopes of element Q. Table 1

Mass number Percentage (%) abundance Isotope 1 107 51.9 Isotope 2 109 48.1 The question is about the particles inside an atom. Figure 1 represents an atom of with 6 protons, 6 neutrons and 6 electrons. Figure 1 Figure 2 [4 marks] Page 3 When chemicals react, atoms inside them swap places to make new compounds, which are the products of the reaction. We have the same atoms but in different patterns. One example of this is when we burn methane. The word equation is methane + oxygen → carbon dioxide + water. In symbols, this is CH₄ + 2O₂ → CO₂ + 2H₂O. If we study the molecules, they look like this: The ideas of relative atomic mass and relative formula mass help us to link these pictures to the real masses of actual objects. The relative atomic mass, or Ar, describes the mass of an element - it's the mass number that you can look up in the periodic table: The mass number is the larger of the two numbers - so the mass number of aluminium is 27. Although we often quote mass numbers as whole numbers, most are not exactly integers. The reason for this is that elements have different isotopes (atoms with the same number of protons, but different numbers of neutrons). For example, the relative atomic mass of chlorine is 35.5. This is an average taken from most chlorine atoms having a mass of 35 (called chlorine-35), and some having a mass of 37 (called chlorine-37). Originally, the relative atomic mass scale was based on hydrogen having one unit. Later on, it was found that using carbon as the basis of the relative atomic mass scale gave better results. Now one unit of relative atomic mass is one-twelfth of the mass of a carbon-12 atom. To work out the relative formula mass (Mr) of a compound or molecule, we just add the relative atomic masses of all the atoms in a chemical formula. Be careful to take account of the number of copies of each atom in the formula. For example: What is the relative formula mass of carbon dioxide, CO₂? 1. Look up Ar for each of the atoms: C = 12, O = 16. 2. Add up the relative atomic masses, counting the numbers of each atom. Mr = 12 + (2 x 16) = 44. It's a good idea to put brackets round the multiplications for each element - this makes sure that you get the right answer. Some chemical formulas have brackets - copper nitrate is Cu(NO₃)₂. This means there are two units of NO₃ in the formula. The atom count for this formula is CuN₂O₆. The reason that relative formula masses are so useful is that they link atomic-scale and real world conservation of mass. Let's go back to the burning (or combustion) or methane: The relative formula masses are CH₄: 12 + (4 x 1) = 16. O₂ = (2 x 16) = 32. CO₂ = 12 + (2 x 16) = 44. H₂O = (2 x 1) + 16 = 18. The total relative formula mass on the reactants side is 16 + (2 x 32) = 80. (We've doubled the mass of O₂ because there are two O₂'s in the reaction). The total relative formula mass on the products side is 44 + (2 x 18) = 80. The clever thing is that the relative formula masses work whatever units we use. So 80 g of reactant make 80 g of product; 80 tonnes of reactant make 80 tonnes of product. They also show balances between individual chemicals: 16 g of methane needs to react with 64 g of oxygen, and they make 44 g of carbon dioxide and 36 g of water. Relative formula masses are a really powerful tool for predicting amounts of chemical produced in reactions. Like any calculations, don't take short cuts, so you don't get confused. Time for some questions now. Isotopes are easy to recognize from their notation as they have the same symbol but different mass numbers. For example, the two stable isotopes of copper are ⁶³Cu and ⁶⁵CuPage 2 It is important to understand the terms atom and molecule when referring to atomic structure, elements and compoundsAtoms & Molecules Definitions Table Elements are made of tiny particles of matter called atoms Each atom is made of subatomic particles called protons, neutrons and electrons Their size is so tiny that we can't really compare their masses in conventional units such as kilograms or grams, so a unit called the relative atomic mass is used One relative atomic mass unit is equal to one twelfth the mass of a carbon-12 atom. All other elements are measured relative to the mass of a carbon-12 atom and since these are ratios, the relative atomic mass has no units Hydrogen for example has a relative atomic mass of 1, meaning that 12 atoms of hydrogen would have exactly the same mass as 1 atom of carbon The relative mass and charge of the subatomic particles are shown below:The Mass & Charge of Subatomic Particles Table The mass of an electron can just be stated as 'negligible' or 'very small' in an exam. You do not need to learn the value. You need to know the following terms to describe the properties and characteristics of atomsAtomic Structure Key Terms Table The term nucleon number is an alternative to mass number and means the same thing. A nucleon is a collective name for protons and neutrons. Page 3 The diagram below shows two different atoms of hydrogen. Which particle is missing from one of the diagrams? The Structure of the AtomKey Terms The atomic structure of an unknown element is shown below. What is the atomic number and mass number for the unknown element? Atomic Number Mass Number A 6 11 B 5 11 C 5 6 D 6 10 The Structure of the AtomKey Terms The table shows information about the two isotopes of boron. Isotope Number of protons Number of neutrons Percentage isotope in sample 1 5 5 19 2 5 6 81 The relative atomic mass of this sample of boron is Calculate Relative Atomic Mass Page 4 This KS4 worksheet is perfect for students to practice calculating moles and mass. There are four tasks each with ten questions. They would make an ideal homework or starter activity. The answers are included. Always good to be given questions. Thank you for sharing. In regards to the previous comment, it is always good practice to work out the answers yourself.Empty reply does not make any sense for the end user This was exactly what I was looking for - lots of practice and gets a little bit more challenging as it goes along. It has saved me so much time! 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