

Solutions

2.1 17 protons; $37 - 17 = 20$ neutrons; 17 electrons.

2.2 (a) Filtration; (b) fractional distillation – different boiling points.

2.3 A compound has its elements chemically combined in fixed proportions; a mixture's substances are not combined and keep their own properties. A compound needs a chemical reaction to separate; a mixture separates by physical processes.

3.1 The plum pudding model was replaced by the nuclear model: most of the mass and all positive charge concentrated in a tiny nucleus at the centre; most of the atom is empty space, since most alpha particles passed straight through; the few deflected showed the nucleus repelled positive charges.

3.2 $\text{Ar} = (24 \times 79 + 26 \times 21) \div 100 = (1896 + 546) \div 100 = 2442 \div 100 = 24.42$.

3.3 Add water and stir to dissolve the salt; filter – the sand is insoluble and stays on the paper; the filtrate is salt solution; evaporate most of the water, then leave to crystallise; dry the crystals on filter paper/in a warm oven.