

11 Particle physics – Part 2 —Answers

Answers

11.1 (a) the atom is mostly empty space.

(b) there is a tiny, dense, positively charged nucleus at the centre.

11.2 A drops by 4 and Z by 2: $A = 222$, $Z = 86$ (it becomes ${}^{222}_{86}\text{Rn}$).

11.3 A stays the same, Z rises by 1: $A = 90$, $Z = 39$ (it becomes ${}^{90}_{39}\text{Y}$).

11.4 A positron is the antiparticle of the electron —same mass, charge $+e$ (positive).

11.5 (a) not fundamental (a proton is a baryon, made of quarks).

(b) fundamental (an electron is a lepton).

11.6 The α -particles are positively charged, and the few that came close to the centre were *repelled* through large angles. Like charges repel, so the centre (the nucleus) must also be positively charged.

11.7 $A = 210 - 4 = 206$, $Z = 84 - 2 = 82$ —the nucleus is ${}^{206}_{82}\text{Pb}$.