

Multiple Choice Answers

Q31: C

Q33: D

Q34: C

9(a)(i)	most of the atom is empty space
9(a)(ii)	any two from: 1 the nucleus is very small 2 mass of gold nucleus is much greater than mass of alpha particle 3 the nucleus is positively charged corresponding explanation to conclusion: 1 not many alpha particles pass close to the nucleus / owtte 2 large force between alpha and nucleus (has bigger effect on small mass of alpha) 3 alpha particles are positively charged, AND force is repulsive
9(b)(i)	(in the nucleus a) neutron is changed into a proton (and an electron which is the emitted β -particle)
9(b)(ii)	22 μg
	(87 years is) three half-lives OR $25 / 8$ OR $87 / 29 = 3$ (half lives)
	1 / 8th (of the strontium remains) OR $25 / 8$ (decays) OR 3.125 seen

10(a)	${}_{95}^{241}\text{Am} \rightarrow {}_{93}^{237}\text{Np} + {}_2^4\alpha$
	${}_{93}^{237}\text{Np}$ nucleon number correct for Np
	${}_{93}\text{Np}$ proton number correct for Np
	$+ {}_2^4\alpha$ alpha notation correct
10(b)(i)	alpha (particles emitted from americium)
	move close to / hit molecules in the air (between the metal plates)
	removing electrons (out of the molecules)
10(b)(ii)	Any two from: • alpha not penetrating / short range AND alpha (particles) stopped by smoke particles • alpha (particles) more highly ionising (than gamma) AND ionise air more easily • range of alpha particles is short / alpha is not penetrating AND alpha less harmful (to humans)