Question number	Answer	Notes	Marks
14 (a)	two protons labelled ; two neutrons labelled ;	ACCEPT: a proton and a neutron for 1 mark ACCEPT: correct labels inside circles	2
(b) (i)	Any **two** of: to avoid / reduce absorption / ionisation / loss of energy of alpha particles ; to avoid / reduce chance of collisions between air molecules and alpha particles ; to allow sufficient range for alpha particles / would stop in few cm of air / does not reach foil ;	ACCEPT: ideas of alpha particle absorption, collision and range expressed in other words IGNORE: speed of alpha particles	2
(ii)	Any **two** of: electrostatic (force) ; repulsion ; between like charges ;	ACCEPT: electric (force) IGNORE: magnetic / poles	2

14 (b) (iii)	Any **five** of: Undeflected alpha particles show – there are gaps between nuclei/atoms mostly empty space; Deflections show – a repulsive force operates; (if electrostatic force) then nuclei have same charge as alpha particles (or both positive charge); (only some) deflected so nuclei are a <u>small</u> target; Large deflections show – nuclei have enough mass for alphas to bounce back; <u>mass</u> of a nucleus is <u>more</u> than the mass of an alpha particle; <u>high</u> density related to mass and <u>small</u> size;	ACCEPT: correct reverse arguments	5

Total 11 marks
PAPER TOTAL: 120 MARKS