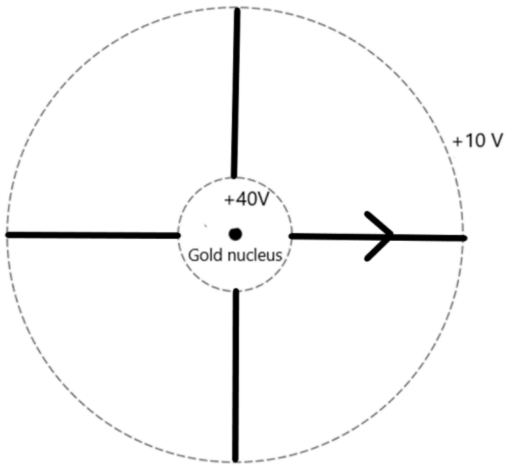
Question Number	Answer	Mark
15(a)	MAX 2 for beta and 2 for gamma Beta • Beta particles are much less massive than alpha particles **(1)** • So beta might be deflected by the electrons (surrounding the nucleus of gold) **(1)** **Or** • Beta more penetrating **(1)** • So beta less likely to interact / scatter / deflect **(1)** **Or** • Alpha has double the charge (of beta) • So for alpha deflecting force will be more (for same separation) **(1)** **(1)** Gamma • Gamma isn't charged • So gamma will not deflect at all (electrostatically) **(1)** **Or** gamma will not experience any electrostatic force **(1)** **Or** • Gamma more penetrating • So gamma less likely to interact **(1)** **(1)**	**3**
15(b)(i)	• At least four straight radial lines between the two potential lines **(1)** • Equidistributed / equispaced **(1)** • At least one arrow pointing away from nucleus **(1)** Example of diagram  	**3**
15(b)(ii)	• Measures the distance to both potential lines from centre of gold nucleus **(1)** • Use of $V = Q/4\pi\varepsilon_0 r$ **(1)** • This line is in the correct place as $V \times r$ is the same for each case **(1)** Example of calculation Measures distance to 40 V = 1 cm and distance to 10 V = 4 cm So $k = 40 \times 1 = 40$ and $k = 10 \times 4 = 40$	**3**
15(b)(iii)	• Charge on alpha particle is 2e **(1)** • Use of potential difference = W/Q • $W = 60$ (eV) **(1)** **(1)** Example of calculation Change in potential = 40 V −10 V = 30 V Change in potential energy = 30 V × 2e = 60 eV	**3**
	Total for question 15	**12**