

Question			Expected response	Max mark	Additional guidance
7.	(a)	(i) (A)	(P =) 53	1	
		(i) (B)	Iodine	1	Or consistent with (a)(i)(A) Accept: I
		(ii) (A)	Lepton(s)	1	
		(ii) (B)	Weak (nuclear force)	1	
	(b)	(i)	$W = QV$ (1) $W = 1.60 \times 10^{-19} \times 32.0 \times 10^3$ (1) $E_k = \frac{1}{2}mv^2$ (1) $1.60 \times 10^{-19} \times 32.0 \times 10^3$ (1) $= 0.5 \times 1.673 \times 10^{-27} \times v^2$ $v = 2.47 \times 10^6 \text{ m s}^{-1}$ (1)	5	Accept: 2.5, 2.474, 2.4740 $W = QV$ anywhere $E_k = \frac{1}{2}mv^2$ anywhere
		(ii)	To ensure the electric field is always in the correct direction. OR To ensure the force acting on a proton is always in the correct direction (as it crosses the gap).	1	To ensure the protons accelerate in the correct direction. Do not accept: same direction
	(c)		Up the page	1	Accept: up/upwards/towards top of the page Arrow drawn pointing up the page is acceptable. If upwards arrow is drawn on the original diagram, it must be on the right-hand edge. The path of the particle on its own is not acceptable.