Question number	Answer		Mark
12 (a)	• Evidence of $E_k = ½ mv^2$ **and** $p = mv$ • Correct algebraic link to $E_k = p^2/2m$ Example of derivation $E_k = ½ mv^2$ $[= m \times mv^2 / 2 \times m]$ $= (mv)^2 / 2m$ $[p = mv]$ $E_k = p^2/2m$	(1) (1)	**2**
12(b)	• Use of $F = Eq$ • Use of $W = Fs$ • Use of $E_k = p^2/2m$ **Or** Use of $E_k = ½ mv^2$ **and** $p = mv$ in conjunction • Momentum = 9.33×10^{-20} kg m s^{-1} Example of calculation $F = 7.64 \times 10^6$ V m^{-1} $\times$ 1.60×10^{-19} C $= 1.22 \times 10^{-12}$ N $W = 1.22 \times 10^{-12}$ N $\times$ 5.50×10^{-3} m $= 6.72 \times 10^{-15}$ J 6.72×10^{-15} J + 6.42×10^{-15} J = 1.31×10^{-14} J 1.31×10^{-14} J = $p^2 / 2 \times 3.32 \times 10^{-25}$ kg $p = 9.33 \times 10^{-20}$ kg m s^{-1}	(1) (1) (1) (1)	**4**
	Total for question 12		**6**