

| Question number | Answer | Notes | Marks |
|-----------------|---|---|-------|
| 7 (a) | movement of electrons; bucket gains electrons; | scores both marks | 2 |
| (b) | (droplets in each stream are) like/same charge; (like charges) repel; | ignore attraction to bucket | 2 |
| (c) (i) | use of $KE = \frac{1}{2}mv^2$; substitution; evaluation; e.g. $KE = \frac{1}{2}mv^2$ $KE = \frac{1}{2} \times 6.2 \times 10^{-9} \times 3.8^2$ (KE =) 4.5×10^{-8} (J) | stated or implied by working -1 for POT error allow 4.4×10^{-8} , $4.47 \times 10^{-8} = 2$ marks allow 4.4764×10^{-8} (J) | 3 |
| (ii) | substitution into $Q = It$; rearrangement; evaluation; e.g. $1.1 \times 10^{-10} = \text{current} \times 9.2 \times 10^{-3}$ $\text{current} = 1.1 \times 10^{-10} / 9.2 \times 10^{-3}$ $\text{current} = 1.2 \times 10^{-8}$ (A) | stated or implied by working -1 for POT error allow $1.195... \times 10^{-8}$ (A) | 3 |
| (iii) | substitution into $E = QV$; conversion of kV to V; evaluation; e.g. $E = 1.1 \times 10^{-10} \times 1.7$ $1.7 \text{ kV} = 1700 \text{ V}$ (E =) 1.9×10^{-7} (J) | allow valid substitution into $E=VIt$ ignore units allow 1700 or $\times 1000$ seen anywhere in working -1 for POT error allow 1.87×10^{-7} (J), 1.88×10^{-7} (J), 1.8768×10^{-7} (J) | 3 |

(Total for Question 7 = 13 marks)