Question number			Answer	Notes	Marks
2	(a)	(i)	centre of gravity / centre of mass;	allow centre of weight	1
		(ii)	balance / newtonmeter;	allow <u>newton</u> scales ignore scales	1
	(b)	(i)	moment = force × (perpendicular) distance;	allow standard symbols and rearrangements e.g. moment = F × d ignore m for moment	1
		(ii)	substitution; e.g. 0.68 × 4.3 (= 2.924 N cm)		1
		(iii)	idea that anti-clockwise moment = clockwise moment; rearrangement; evaluation; e.g. 2.9 = F × 11 F = 2.9 / 11 (F =) 0.26 (N)	stated or implied by working allow ECF from (ii) allow 0.2636...-0.2658... allow 0.27 condone 0.263	3

(Total for Question 2 = 6 marks)

(Total for Question 4 = 11 marks)

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 = ½mv^2; substitution; evaluation; e.g. KE = ½mv^2 KE = ½ × 6.2 × 10^{-9} × 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 × 10^{-8} = 2 marks allow 4.4764 × 10^{-8} (J)	3
(ii)	substitution into Q = It; rearrangement; evaluation; e.g. 1.1 × 10^{-10} = current × 9.2 × 10^{-3} current = 1.1 × 10^{-10} / 9.2 × 10^{-3} current = 1.2 × 10^{-8} (A)	stated or implied by working -1 for POT error allow 1.195… × 10^{-8} (A)	3
(iii)	substitution into E = QV; conversion of kV to V; evaluation; e.g. E = 1.1 × 10^{-10} × 1.7 1.7 kV = 1700 V (E =) 1.9 × 10^{-7} (J)	allow **valid** substitution into E=VIt ignore units allow 1700 or ×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)