Question number	Answer	Notes	Marks
13 (a)	A (chemical → electrical → kinetic)		1
(b) (i)	KE = ½ x m x v^2 ;		1
(ii)	substitution into correct equation; Calculation; e.g. ½ x 600 x 28^2 ; 240000 (J);	correct answer = 2 marks ACCEPT 235200 (J);	2
(c) (i)	gpe = mass x *g* x height;	ACCEPT GPE = mgh ACCEPT gravitational field strength/acceleration due to gravity for g	1
(ii)	substitution into correct equation; Calculation; e.g. 600 x 10 x 1000 6 000 000 (J) or 6000 k(J) or 6 M(J)	correct answer = 2 marks ALLOW 5 880 000 (from *g* = 9.8)	2
(iii)	EITHER <u>Calculation of energy supplied (by fuel cells)</u> 24 kW x 180 s OR 4 320 000 (J); <u>Comparison with energy required</u> 4 320 000 < 6 000 000; OR <u>Calculation of power required</u> 6 000 000 J ÷ 180 s OR 33.3 kW; <u>Comparision with fuel cells</u> 33.3 kW > 24 kW;	 ALLOW ECF if 6 000 000 not seen ALLOW ECF if 6 000 000 not seen	2

Question number	Answer	Notes	Marks
13 (c) (iv)	use of P= I x V for one cell ; e.g. 30 x 0.6 OR 18(W) calculation; e.g 24 000 ÷ 18 = 1333 (> 1300) OR 1300 x 18 = 23400 (< 24000) ALTERNATIVE Using E= IVt for one cell; e.g. 30 x 0.6 x180 OR 3240(J) calculation; e.g. 4 320 000 ÷ 3240 = 1333 (> 1300) OR 1300 x 3240 = 4 212 000 (< 4 320 000)	First Marking Point can be credited if ‘18’ or ’30 x 0.6’ seen in calculation	2

Total 11 Marks