

Question number	Answer	Notes	Marks
10 a	a moon orbits a <u>planet</u> ; a planet orbits a star (/the Sun) ;	Ignore <ul style="list-style-type: none"> <li>• comments about eccentricity, oval, plane of orbit, time of orbit etc</li> </ul>	1 1
b	Substitution; Evaluation; Unit (to <b>match</b> the value of v); e.g. $V = \frac{(2 \times \pi \times 385000)}{27} = \frac{2\,417\,800}{27}$	Note value of $\pi$ used may vary time values and corresponding approximate speeds are 27 days..... 89 600 km/days 648 hours..... 3 731 km/ hours 38 880 mins..... 62 km/min 2 332 800 s..... 1.04 km/s	1 1
	90 000 km/day	allow answers which round to 89 600 Accept suitable <b>matching</b> units	1
c i	$E = \frac{1}{2} mv^2$ ;	Accept <ul style="list-style-type: none"> <li>• rearranged equation</li> <li>• equation in words</li> </ul>	
ii	substitution ; Mass converted to kg ; 47.(33.....) seen;	allow sub of mass as 50 g 1.496 or 1.5 seen gets 2 marks	3
d i	44(J) ;		1
ii	GPE = mgh;	Accept <ul style="list-style-type: none"> <li>• rearranged equation</li> <li>• equation using (all the) words</li> </ul> Allow for 'g' <ul style="list-style-type: none"> <li>• gravitational field strength but NOT gravity</li> </ul>	1

iii	Substitution and rearrangement; Calculation ; $\frac{12}{0.05 \times 1.6}$ 150 (m)	POT error loses 1 mark e.g. 0.15 (m) gets 1 mark	2
e	any Two from: • Value of g lower(on the Moon)/RA; • lack of air resistance (on the Moon)/RA; • Time of flight greater;	ignore • 'no gravity' allow • less gravity • drag for air resistance	2

(Total for Question 10 = 15 marks)