Question number	Answer	Notes	Marks
1 (a)	78 seen; = 78 / 60; 1.3;	acceleration = (final v – starting v)/time; CORRECT ANSWER WITH NO WORKING = (3)	3
(b)	air resistance (when moving); increases as velocity / speed increases; reducing resultant force;	ACCEPT drag IGNORE wind resistance IGNORE friction with ground 'friction' alone needs qualification REJECT 'reaches terminal velocity'	3

Question number	Answer	Notes	Marks
2(a) (i)	Gradient of graph / attempt; Answer; Unit; e.g. 2 / 1.26 1.6 m/s^2	ALLOW value truncated or correctly rounded from 1.587301587... (no sf penalty)	1 1 1
(ii)	Area under graph / attempt; Answer; e.g. ½ x 1.26 x 2 1.26 (m)		1 1
(b)	Moon has less <u>mass</u> (than Earth) / Moon has lower density (than Earth) / ORA for either;	IGNORE 'Moon is smaller'	1
(c)	ANY FOUR of Feather is lighter / has less mass / weighs less; reaches terminal velocity / drag = weight; earlier / sooner / before hammer; (because) smaller (drag) force needed; (so) average velocity of feather is lower / falls slower;	IGNORE surface area	4
		Total	**10**

Question number			Answer	Notes	Marks
3	(a)	(i)	42 (m/s)	Allow range 42 - 43	1

		(ii)	Attempt to calculate slope;
			Answer;
			Unit;
			
			$42 \div 15$
			
			2.8
			
			m/s^2
				Allow value from (i)
				e.g. 43 m/s → 2.9 m/s^2
				  42.5 → 2.83 m/s^2
				  45 → 3 m/s^2
				
				not 42/120
				allow 42/20
					3

		(iii)	Attempt to calculate an area under graph line; Appropriate further working (e.g. adding areas); Answer; (½ x 15 x 42) + (80 x 42) + (½ x 25 x 42) 315 + 3360 + 525 4200 (m)	Allow value from (i) e.g. 43 m/s → 4300 m first 2 MP may be gained using the trapezium method, i.e. 42 x (120+80)/2 Bald correct answer scores 3	3

Question number		Answer	Notes	Marks
	(b)	Any **three** from 1. Stopping distance affected by speed or mass; 2. For faster plane, stopping distance greater/ runway too short ; 3. for heavier plane stopping distance greater/ runway too short; 4. Attempt to calculate stopping distance from graph; 5. Data shows most/all of runway already used;	ignore time = 500/40 Allow a momentum argument for MP1, 2, 3	3
			Total	**10**

Question number			Answer	Notes	Marks
4	(a)	(i)	A – distance A		1
		(ii)	D – force D		1
	(b)	(i)	Force (C) in N; or Force in newtons;	Allow: Reading from newton-meter in N	1
		(ii)	Plotting ;; Line of best fit;	To nearest ½ square, penalise errors up to two marks Suited to candidate's plotting (allow a smooth curve) no double lines judge LoBF by balance of points about the line	3
		(iii)	Reading from graph to ± 1 cm; e.g. 46	To nearest ½ small square	1

Within (b)(ii):
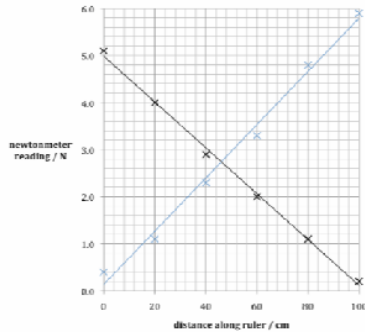
0	5.1
20	4.0
40	2.9
60	2.0
80	1.1
100	0.2

Question number	Answer	Notes	Marks
4 (c)	weight of ruler;	Accept other valid reasons allow force for weight ignore 'it's got a force acting' 'because of gravity'	1
		Total	**8**