PEARSON EDEXCEL GCSE PHYSICS (HIGHER) · 1PH0

PHYSICS



MARK SCHEME

TOPIC 2: MOTION AND FORCES

SCORE	PERCENTAGE
/103	%

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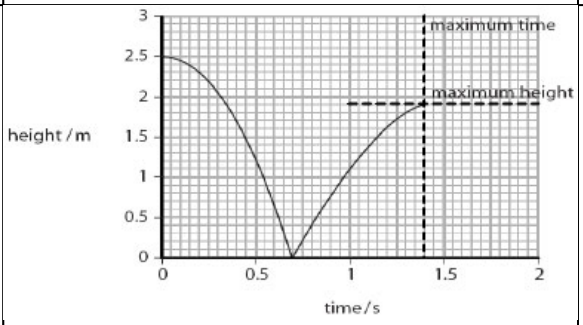
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Mark Scheme

Q1.

	Answer	Acceptable answers	Mark
(i)	2.5 (m)	Allow answers between (and including) 2.45 & 2.55	**(1)**
(ii)	0.7 (s)	Allow answers between (and including) 0.68 & 0.72	**(1)**
(iii)	 line: same shape as original (1) peak at 1.9 m (1) time taken < 0.7 s (1)	Ignore any part of the graph after the peak	**(3)**
(iv)	An explanation linking: energy lost (1) in collision with ground / air resistance (1)	Inelastic collision worth (2) as sound or heat	**(2)**

Q2.

Question number	Answer	Additional guidance	Mark
(a)(i)	Calculating the mean (1) 18.36 Rounding to 2 s.f. (1) 18 (cm)	award full marks for correct numerical answer without working	**(2)**

Question number	Answer	Additional guidance	Mark
(a)(ii)	Rearrangement (1) $t = \sqrt{\frac{\text{distance}}{500}}$ Substitution and answer (1) time = 0.17 (s)	award full marks for correct numerical answer without working allow answers which round to 0.17, e.g. 0.1673	(2)

Question number	Answer	Additional guidance	Mark
(b)	An explanation that combines identification via a judgement (1 mark) to reach a conclusion via justification/reasoning (1 mark): • 25.5 is an anomalous result (1) • (because) it is much further away from the mean than the other results (1)	ignore 19	(2)

Question number	Answer	Mark
(c)	• Take more readings (1) • Idea that a third student should also measure the reaction time (1)	(2)

Question number	Answer	Additional guidance	Mark
(d)	An answer that combines the following points to provide a logical description of the plan/method/experiment: • using a larger group of students/large population of students (1) • and measure how their reaction time varies with age/height (1)	allow any suitable variable	(2)

Q3.

	Answer	Acceptable answers	Mark

	A 600 kg m/s		**(1)**

Q4.

	Answer	Acceptable answers	Mark
(a)	**C** when the bungee cord is stretched the most		**(1)**
(b)	**A** 600 kg m/s		**(1)**
(c)(i)	Substitution: (1) 60 × 10 × 50 or 600 × 50 Evaluation: (1) 30 000 Unit: (1) J / Nm	 give two marks for correct answer no working j / joule 30 kJ for full marks	**(3)**
(c)(ii)	After falling 50 m / when the cord becomes straight/when cord starts to stretch	tension starting to increase at terminal velocity ignore maximum velocity/speed	**(1)**
(c)(iii)	An explanation linking any two of not all GPE is transferred to KE (1) some {of the GPE transfers to thermal energy /work is done} (1) due to drag (1)	 not all GPE goes to KE maximum energy is same (value) as GPE before falling /speed does not reach the speed at which he should fall some lost as heat/sound (of rope or movement through air) (air) resistance / friction ignore wind	**(2)**

Q5.

Question number	Answer	Additional guidance	Mark
(i)	substitution (1) (force =) $\frac{8.7}{0.35}$ evaluation (1) 25 (N)	use of force = $\frac{\text{change in momentum}}{\text{time}}$ allow numbers that round to 25 e.g 24 .8571 award full marks for correct answer without working.	**(2)** **AO2**

Question number	Answer	Additional guidance	Mark
(ii)	(magnitude) 25 (N) (1) (direction) down(wards)/ towards floor (1)	ecf from i allow arrow drawn pointing down "south"	**(2)** **AO3**

Q6.

Question number	Answer	Additional guidance	Mark
(i)	substitution (1) $371 = (64.5 + m) \times 3.5$ rearrangement (1) $m + 64.5 = 371 / 3.5$ evaluation of total mass (1) $m + 64.5 = 106$ (kg) evaluation of woman's mass (1) $m = 106 - 64.5$ $= 41.5$ (kg)	full marks will be awarded for correct numerical answer without working	**(4)**

Question number	Answer	Additional guidance	Mark
(ii)	substitution (1) KE = ½ x 64.5 x 3.5^2 evaluation (1) 395 (J)	 allow answers which round to 395 e.g. 395.0625 full marks will be awarded for correct numerical answer without working	(2)

Q7.

Question number	Answer	Additional guidance	Mark
(i)	attempt to use correct data from graph or equation (1) substitution (1) (a =) $\frac{26 - 14}{34}$ evaluation to 2 sf (1) 0.35 (m/s^2)	quoting $a = \frac{(\Delta) v}{t}$ or a = gradient (of line) 0.3529... scores mp1 and mp2 $\frac{26}{34}$ scores mp1 independent mark award full marks for correct answer without working.	(3) AO2

Question number	Answer	Additional guidance	Mark
(ii)	attempt to calculate area under the line (1) calculates EITHER area of triangle OR area of rectangle (1) 204 (m) or 476 (m) evaluation (1) 680 (m)	accept count squares use of $v^2-u^2 = 2ax$ $x = \frac{v^2-u^2}{2a}$ allow ecf from (i) award full marks for correct answer without working award 1 mark for final answer 408 (m)	**(3)** **AO2**

Q8.

Question Number	Answer	Additional guidance	Mark
(i)	substitution in $v^2 - u^2 = 2ax$ (1) $24^2 - 7.6^2 = 2 \times 3 \times x$ rearrangement (1) $(x =) \frac{24^2 - 7.6^2}{6}$ evaluation (1) 86 (m)	accept rearrangement and substitution in either order allow numbers that round to 86 (m) award full marks for the correct answer without working	**(3)**

Question Number	Answer	Additional guidance	Mark
(ii)	recall and substitution (1) $(a = \frac{v - u}{t})$ $3.0 = \frac{24 - 7.6}{t}$ rearrangement (1) $t = \frac{v - u}{a}$ OR $(t =) \frac{24 - 7.6}{3.0}$ evaluation (1) 5.5 (s)	Allow alternative method: average speed = distance / time i.e. 15.8 = 86(.37) / time (t =) 86(.37) / 15.8 allow numbers that round to 5.5 (s) OR numbers that round to 5.4 if using alternative method and distance = 86 award full marks for the correct answer without working no marks for t = d / (v-u) = 86(.37) / (24-7.6) giving 5.3 s as an answer	**(3)**

Q9.

	Answer	Additional guidance	Mark
(i)	conversion of time to s (1) (t =) 0.012 **OR** 12×10^{-3} **OR** 1.2×10^{-2} substitution (1) $(F=)\frac{(0.075\times-15.0)-(0.075\times8.2)}{0.012}$ OR $(F=)\frac{(0.075\times15.0)-(0.075\times-8.2)}{0.012}$ OR $(F=)\frac{0.075\times(15.0+8.2)}{0.012}$ evaluation (1) (-)150 (N)	substitution and conversion in either order ignore signs on velocity accept time to any power of ten for substitution mark $(F=)\frac{(1.125)+(0.615)}{0.012}$	**(3)** **AO2**

		145 (N) scores 3 marks 145 (N) to any other power of ten scores 2 marks maximum 42.5 (N) scores 2 marks maximum 42.5 (N) to any other power of ten scores 1 mark maximum 93.75 (N) or 51.25(N) 1.933 scores 1 mark maximum award full marks for correct answer without working	

	Answer	Additional guidance	Mark
(ii)	Any two from: (forces are) equal / same size (1) (forces are) opposite (direction) (1) (forces) act on different bodies (1) same type of force (1)	no marks awarded for answers in terms of energy (forces are) one to the left, one to the right one (force) acts on racket, one acts on ball both are contact forces if no other marks awarded, allow action and reaction (acting) for 1 mark	**(2)** **AO1**

Q10.

Question number	Answer	Additional guidance	Marks
(i)	recall K.E.= ½ m v^2(1) rearrangement (1) (m =) 2 x K.E. ÷ v^2 substitution (1) (m =) 2 x 960 000 ÷ 40^2 Evaluation (1) = 1200 (kg)	award full marks for the correct answer without working rearrangement and substitution in either order Ignore POT until evaluation	(4)

Question number	Answer	Additional guidance	Marks
(ii)	Use of efficiency equation (1) $\frac{960}{5}$ evaluation (1) =19 (MJ)	award full marks for correct numerical answer without working accept 19.2 (MJ)	(2)

Q11.

Question number	Answer	Additional guidance	Mark
	Two stage calculation substitution$_1$ (1) $(v^2 - 0 =) 2 \times 10 \times 3.8$ evaluation of v (1) $(v =)$ 8.7 (m/s) substitution$_2$ (1) $0.40 = m \times 8.7$ rearrangement and evaluation (1) $(m =)$ 0.046 (kg)	 use of $v^2 - u^2 = 2ax$ OR $\frac{1}{2} mv^2 = mgh$ 76 allow numbers that round to 8.7 e.g. 8.718 use of $p = mv$ allow numbers that round to 0.046 e.g. 0.04598 award full marks for correct answer without working.	**(4)** **AO2**

Q12.

Question number	Answer	Additional guidance	Mark
	substitution (1) $(t^2=)\ \frac{2 \times 1.4}{10}$ evaluation (1) $(t =)$ 0.53 (s)	 0.28 allow numbers that round to 0.53 e.g. 0.52915 award full marks for correct answer without working.	**(2)** **AO2**

Q13.

Question Number	Answer	Additional guidance	Mark
	rearrangement (1) $a = \frac{(v^2-)u^2}{2x}$ substitution (1) $a = \frac{(-)15^2}{2 \times 14}$ evaluation (1) deceleration = 8(.04) (m/s^2)	 rearrangement and substitution in either order 225/28 for 2 marks accept – 8(.04) award full marks for the correct answer with no working	**(3)** AO 2 1

Q14.

	substitution: 0.5 × 18 (1) evaluation 9.0 (1)	 9	**(2)**

		give full marks for correct answer no working	

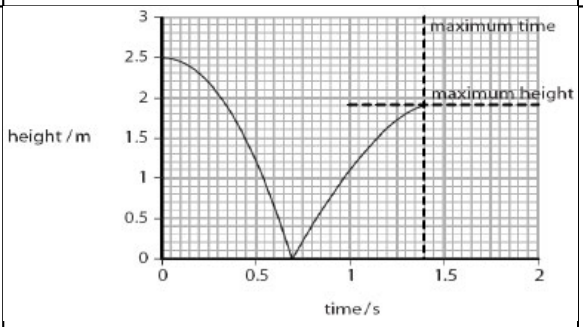
Q15.

Question number	Answer	Additional guidance	Mark
(a)	Rearrangement (1) $m = \frac{f}{a}$ Substitution and conversion (1) $m = \frac{1870}{1.83}$ Answer and rounding to 3 s.f. (1) 1020 (kg)	maximum 2 marks if kN not converted to N award full marks for correct numerical answer without working	**(3)**

Question number	Answer	Additional guidance	Mark
(b)	Rearrangement of $\frac{(v-u)}{t} = a$ (1) $v = u + at$ Substitution (1) $v = 0 + 1.83 \times 16$ Answer (1) 29.3 (m/s)	award full marks for correct numerical answer without working	**(3)**

Question number	Answer	Mark
(c)	Correctly identifies data points from the graph to calculate areas (1) Calculates area under AB (1) 240 m Calculates area under CD (1) 135 m distance travelled at constant speed = 240 m is greater than distance travelled when slowing down = 135 m (1)	**(4)**

Q16.

	Answer	Acceptable answers	Mark
(a)(i)	2.5 (m)	Allow answers between (and including) 2.45 & 2.55	**(1)**
(a)(ii)	0.7 (s)	Allow answers between (and including) 0.68 & 0.72	**(1)**
(a)(iii)	 line: same shape as original (1) peak at 1.9 m (1) time taken < 0.7 s (1)	Ignore any part of the graph after the peak	**(3)**
(a)(iv)	An explanation linking: energy lost (1) in collision with ground / air resistance (1)	Inelastic collision worth (2) as sound or heat	**(2)**
(b)(i)	shown using data Any two from kinetic energy before = 12.5 + 0 (=12.5) (1) kinetic energy after = 4.5 + 8 (=12.5) (1) Kinetic energy is the same before and after the collision (1)	Kinetic energy is conserved/no energy lost	**(2)**
(b)(ii)	cyclotron (1)	named particle accelerator accept CERN	**(1)**

Q17.

Question Number	Answer	Mark
*	Answers will be credited according to candidate's deployment of knowledge and understanding of the material in relation to the qualities and skills outlined in the generic mark scheme. The indicative content below is not prescriptive and candidates are not required to include all the material which is indicated as relevant. Additional content included in the response must be scientific and relevant. **AO1 (6 marks)** • momentum = mass × velocity • action and reaction are equal and opposite (N 3) • force of R on Q = -force of Q on R • $\frac{\text{change in momentum of Q}}{\text{time}} = -\frac{\text{change in momentum of R}}{\text{time}}$ • time of collision same for both • change in momentum of Q = - change in momentum of R • no overall change in momentum • R accelerates because of force from Q • transfer of momentum between Q and R	**(6)** AO 1 1

Level	Mark	Descriptor
	0	• No rewardable material.
Level 1	1-2	• An explanation that demonstrates elements of physics understanding, some of which is inaccurate. Understanding of scientific ideas lacks detail. (AO1) Presents an explanation with some structure and coherence. (AO1)
Level 2	3-4	• An explanation that demonstrates physics understanding, which is mostly relevant but may include some inaccuracies. Understanding of scientific ideas is not fully detailed and/or developed. (AO1) • Presents an explanation that has a structure which is mostly clear, coherent and logical. (AO1)
Level 3	5-6	• An explanation that demonstrates accurate and relevant physics understanding throughout. Understanding of the scientific ideas is detailed and fully developed. (AO1) • Presents an explanation that has a well-developed structure which is clear, coherent and logical. (AO1)

Q18.

	Answer	Acceptable answers	Mark

(a)(i)	momentum = 0.03 × 170 (1)	Accept 5.1 seen	**(1)**
(a)(ii)	momentum before = momentum after (1) 5.1 = 0.83 × v (1) v = 6.1 (m/s) (1)	allow 5.0 = 0.80 x v for 1 mark max 5.0 = 0.83 × v v = 6.0 (m/s) allow ecf from (a)(i) give full marks for correct answer, no working	**(3)**
(a)(iii)	Statement to include any two from • kinetic energy is not conserved (1) • (lost ke) appears as heat/sound (1) • momentum is conserved (1)	 ke not conserved / some ke lost no momentum lost	**(2)**
(b)(i)	an explanation linking • momentum (must be) conserved (1) • so must have positive and negative momentum (1)	 photons move in opposite directions indication of movement in opposite directions (e.g. opposite velocities)	**(2)**
(d)(ii)	E = (2 ×) 9.1 × 10^{-31} × [3 × 10^{8}]^{2} (1) = 1.6 × 10^{-13} (J) (1)	8.2 × 10^{-14} (0.82 × 10^{-13}) for 1 mark give full marks for correct answer, no working	**(2)**

Q19.

Question Number	Answer	Additional guidance	Mark
	☒ B centripetal force **The only correct answer is B (correct term for circular motion)** **A** is not correct – incorrect term **C** is not correct – incorrect term **D** is not correct – incorrect term		**(1)**

Q20.

Question Number	Answer	Acceptable answers	Mark
(a)(i)	Circular/spiral/circle		**(1)**

Question Number	Answer	Acceptable answers	Mark
(a)(ii)	An explanation linking three of the following. • (fast moving) <u>protons</u> (1) • absorbed by (1) • nuclei (1) • (produces)unstable nuclei (1)	bombard / hit /strike / collide with stable atoms / stable element	**(3)**

Question Number	Answer	Acceptable answers	Mark
(b)(i)	B momentum		**(1)**

Question Number	Answer	Acceptable answers	Mark
(b)(ii)	(Momentum/it)equals mass x <u>velocity</u>	p = m x v kilograms / kg is the mass and metres per second / m/s is the <u>velocity</u> Accept "times" for x	**(1)**

Question Number		Indicative Content	Mark
QWC	*** (b) (iii)**	An explanation including some of the following points Diagram 1 • Moving in opposite directions before collision • inelastic collision • stationary after collision • momentum zero after collision • (therefore) total momentum must have been zero before collision • (therefore) cars were moving at the same speed in opposite directions (assuming cars have equal mass) • both cars had kinetic energy before the collision • KE zero after collision • KE converted into heat, sound, elastic potential energy etc. Diagram 2 • Elastic collision / almost elastic collision • Momentum conserved • Momentum transferred from first to last sphere • KE conserved / almost conserved • (because)last sphere reaches same height as first sphere • Three spheres always have zero momentum • Small amount of energy transferred to sound/heat	**(6)**

Level	**0**	No rewardable content
1	**1 - 2**	• A limited analysis of ONE collision which is given by a correct statement e.g. In collision 1, kinetic energy has been lost OR In collision 2 momentum is transferred from the first to the last sphere. • the answer communicates ideas using simple language and uses limited scientific terminology • spelling, punctuation and grammar are used with limited accuracy
2	**3 - 4**	• a simple analysis of BOTH collisions considering BOTH momentum AND kinetic energy correctly for each one e.g. In collision 1, momentum is conserved and the kinetic energy of the cars changes. In collision 2, momentum and the kinetic energy is conserved. • answer communicates ideas showing some evidence of clarity and organisation and uses scientific terminology appropriately • spelling, punctuation and grammar are used with some accuracy
3	**5 - 6**	• a detailed analysis of BOTH collisions considering momentum AND kinetic energy for each collision correctly for each AND detailed reference to EITHER diagram. e.g. In collision 1, the momentum before and after the collision is zero because momentum is always conserved, but the KE is lost. In collision 2, all the momentum and KE is transferred to the last sphere because it gets to the same height as the first one. • the answer communicates ideas clearly and coherently uses a range of scientific terminology accurately • spelling, punctuation and grammar are used with few errors

(Total marks for question = 12 marks)

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Q21.

	Answer	Additional guidance	Mark
(i)	a description using any **four** of the following points in a logical order: measure the mass / weight of the trolley(s) / weigh the trolley(s) (1) determine the speed of trolley A (1) put one light gate (connected to data logger) further down the runway than trolley A and another beyond trolley B (1) trollies A and B stick together (1) measure combined velocity / speed of A and B (1) calculate momentum of trolley A before collision **and** A and B after collision (1) check for equality / velocity after collision is half that before collision (1) repeat **and** take mean / average (1)	 allow determine / find / calculate use (average) speed = distance / time to calculate speed of trolley A may be shown on diagram measure distance and time in appropriate places calculate (total) momentum before and after collision (total) momentum before equals (total) momentum after	**(4)** **AO1**

	Answer	Additional guidance	Mark
(ii)	{compensating for / reducing **effect** of / overcoming / balancing / cancelling **effect** of} friction OR so that trolley A travels at a constant speed / doesn't slow down	do not accept reducing / cancelling friction do not accept so trolley accelerates down slope	(1) AO3

Q22.

Question number	Answer	Additional guidance	Mark
	A description to include: measurement of (relevant) distance (1) measurement of (relevant) time (1) use of speed = $\frac{\text{distance}}{\text{time}}$ (1) detail (1)	 one of distance down slope or distance along bench or length of toy car/card 'record the distance the car travels and time it' scores 2 marks For example: speed down slope × 2 mark distance along bench use a light gate speed gun at the bottom of the slope Repeating AND averaging	(4)

Q23.

Question Number	Answer	Additional guidance	Mark
	A description including: measure appropriate distance (1) measure appropriate time (1) use (average) speed = $\frac{\text{distance}}{\text{time}}$ (1)	 e.g. distance along runway from max height to P e.g. start the watch when trolley stops stop the watch when trolley hits spring accept $s = \frac{d}{t}$	**(3)**

Q24.

	Answer	Acceptable answers	Mark
(a)(i)	B it decreases		**(1)**
(a)(ii)	C it does not change		**(1)**
(b)(i)	horizontal arrow (judge by eye), pointing to the right **anywhere** on the diagram 		**(1)**
(b)(ii)	substitution: (1) 130 000 × 75	give full marks for correct answer, no working	**(2)**

	evaluation: (1) 9 750 000 (kgm/s) (Ns)	Ignore minus sign 9.75×10^6 (kgm/s) (Ns)	
(b)(iii)	9 750 000 kgm/s	same value as answer to (b)(ii) Ignore minus sign	**(1)**
(c)(i)	An explanation linking two of the following: • force is smaller/less (1) • momentum changes more slowly (1) • lower deceleration (1) • use of the formula (1)	pressure is smaller/less slower deceleration force is proportional to rate of change of momentum/F= (mv – mu)/t	**(2)**
(c)(ii)	Any two from: (for loaded aircraft) • has more mass (1) • has more momentum (1) • has more k.e. (1) • higher velocity • brakes need to do more work (1)	accept reverse argument for empty aircraft heavier/more passengers/more cargo higher speed/moving faster	**(2)** **expert**

Total marks for question = 10 marks

Q25.

	Answer	**Acceptable answers**	**Mark**
(a)	kinetic (energy)	Movement (energy) KE	**(1)**
(b)	substitution: 0.6 × 20 (1) evaluation 12 (1) J (1)	give 2 marks for correct answer no working unit is an independent mark joules, Nm, kgm^2/s^2 , Ws	**(3)**
(c)	substitution: 0.5 × 18 (1) evaluation 9.0 (1)	9 give full marks for correct answer no working	**(2)**

	Indicative Content	

QWC	***(d)**	a description including some of the following points: • chemical to kinetic while in his hand • kinetic (gradually) to potential while rising / fr • eventually all potential at 10 m with a little the energy • some mention of conservation of energy • potential (gradually) to kinetic as falls / 10 m-0 • with a little more thermal (heat) energy • at 0 m sound energy • at 0 m thermal (heat) energy

Level	**0**	No rewardable content
1	**1 - 2**	• a limited description which identifies a change in one relevant type energy or a transfer of energy from one form to another e.g. kinetic energy increases OR kinetic energy changes to sound. • the answer communicates ideas using simple language and uses limited scientific terminology • spelling, punctuation and grammar are used with limited accuracy
2	**3 - 4**	• a simple description giving detail of a relevant energy change/transfer e.g. kinetic energy changes into potential energy as it moves upwards OR kinetic energy increases as it falls. • the answer communicates ideas showing some evidence of clarity and organisation and uses scientific terminology appropriately • spelling, punctuation and grammar are used with some accuracy
3	**5 - 6**	• a detailed description of a sequence of relevant energy changes /transfers e.g. kinetic energy is transferred into potential energy as it rises. This then changes back into kinetic energy as it falls back down. • the answer communicates ideas clearly and coherently uses a range of scientific terminology accurately • spelling, punctuation and grammar are used with few errors

Q26.

Question number	Answer	Additional guidance	Mark
(a)(i)	0.45 (s) (1)	Allow any value ≥ 0.4 and ≤ 0.5	**(1)**

Question number	Answer	Additional guidance	Mark
(a)(ii)	An explanation that combines improvement of the experimental procedure (1 mark) and justification/reasoning which must be linked to the improvement (1 mark) • take pictures more frequently (1) • in order to determine exact time of the release. (1)	other responses may be acceptable	**(2)**

Question number	Answer	Additional guidance	Mark
(a)(iii)	Substitution (1) F = 7.26 x 20.6 Evaluation (1) 150 (N)	Accept 149.6 (N) full marks will be awarded for correct numerical answer without working	(2)

Question number	Answer	Additional guidance	Mark
(a)(iv)	Rearrangement (1) v = a x t Substitution (1) v = 23 x 0.48 Evaluation (1) 11 m/s	Accept 11.04(m/s) full marks will be awarded for correct numerical answer without working	(3)

Question number	Answer	Additional guidance	Mark
(b)	Substitution (1) PE = 7.26 x 10 x 1.3 Evaluation (1) 94.4 (J)		(2)

Q27.

Question number	Answer	Additional guidance	Mark
	An explanation linking any four from force(s) associated with change(s) in momentum (use of Newton's second law) (1) detail of momentum changes, involving time (1) time of collision is same for both (1) (therefore) momentum change is the same for both (1) equal and opposite forces mean equal and opposite momentum changes (1) (total) momentum before a collision = (total) momentum after collision (1) (conservation of momentum requires) no external forces acting (1)	$F = \frac{(mv-mu)}{t}$ $F=ma$ $\frac{m_1v_1 - m_1u_1}{t} = -\frac{(m_2v_2 - m_2u_2)}{t}$ with explanation leading to $m_1u_1 + m_2u_2 = m_1v_1 + m_2v_2$ for both marks	**(4) Exp**

Q28.

Question number	Answer	Additional guidance	Mark
	An explanation that combines up to 3 points of application of knowledge and reasoning/justification • Momentum increased if final velocity can be increased (1) • Distance (while in athlete's hand) is greater (1) • Time whilst subject to force is longer (1) • using the equation F = (mv-mu)/t (1)	Ignore references to shot after it has left the athletes hand accelerating for a longer time use of $v = u + at$ or use of $v^2-u^2 = 2ax$	**(3)**

Q29.

Question number	Answer	Additional guidance	Mark
	An explanation linking three of: acceleration increases (1) as F = ma (1) (and) mass decreases (1) due to burning/using fuel (1)	 independent mark	**(3)** **AO1**

Q30.

Question number	Answer	Additional guidance	Mark
(i)	(students') reaction time (is significant compared with recorded time) (1)	g is really 9.8	**(1)** **AO2**

Question number	Answer	Additional guidance	Mark
(ii)	**One** from use light gates (1) use automatic timer (1) Use time lapse/ stroboscopic photography (1) drop from greater height (1)	 ignore repeats or more people	**(1)** **AO3**