Practice Question Set For GCSE
Subject : Physics
Paper-1 Topic : 2_Motion and Forces

Name of the Student:_____
Max. Marks : 18 Marks **Time : 18 Minutes**

Mark Schemes

Q1.

Question number	Indicative content	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. momentum • momentum is product of mass and velocity • p=mv • momentum is a vector quantity • momentum of P = mv • momentum of Q =-mv • total momentum before collision is zero • $mv_p + (-mv_q) = 0$ • momentum after collision must be zero • total momentum before = total momentum after	**6** **AO1.2** **AO2.2**

Downloaded from www.merit-minds.com

	energy • before collision each trolley has kinetic energy • KE = $\frac{1}{2}mv^2$ • total KE before collision is sum of KE of both trolleys • KE after collision is zero • KE transferred to thermal (store) • KE transferred by heating and by sound • energy dissipated to surroundings **Ignore references to equal and opposite forces and the laws of motion**	

Level	Mark	Descriptor
	0	No awardable content
Level 1	1-2	• Demonstrates elements of physics understanding, some of which is inaccurate. Understanding of scientific ideas lacks detail. (AO1) • The explanation attempts to link and apply knowledge and understanding of scientific ideas, flawed or simplistic connections made between elements in the context of the question. (AO2)
Level 2	3-4	• Demonstrates physics understanding, which is mostly relevant but may include some inaccuracies. Understanding of scientific ideas is not fully detailed and/or developed. (AO1) • The explanation is mostly supported through linkage and application of knowledge and understanding of scientific ideas, some logical connections made between elements in the context of the question. (AO2)
Level 3	5-6	• Demonstrates accurate and relevant physics understanding throughout. Understanding of the scientific ideas is detailed and fully developed. (AO1) • The explanation is supported throughout by linkage and application of knowledge and understanding of scientific ideas, logical connections made between elements in the context of the question. (AO2)

Downloaded from www.merit-minds.com

Level	Mark	Additional Guidance	General additional guidance – the decision within levels e.g. - At each level, as well as content, the scientific coherency of what is stated will help place the answer at the top, or the bottom, of that level.
	0	No rewardable material.	
Level 1	1–2	Additional guidance isolated fact(s) about the momentum and/or energy of trolleys, before or after collision	Possible candidate responses momentum before collision equals momentum after collision momentum is mass x velocity momentum is a vector energy cannot be created or destroyed $KE=\frac{1}{2}mv^2$
Level 2	3–4	Additional guidance limited description of conservation of momentum and limited description of conservation of energy OR detailed description of either conservation of energy or conservation of momentum	Possible candidate responses momentum/velocities of trolleys is equal and opposite before collision / zero before collision/zero after collision. trolleys have kinetic energy before collision OR the trolleys have kinetic energy before the collision which is transferred to thermal energy after the collision.
Level 3	5–6	Additional guidance detailed description of conservation of momentum before and after collision and limited description of conservation of energy OR detailed description of energy conservation and limited description of conservation of momentum	Possible candidate responses momentum of trolleys before collision is equal and opposite giving zero, and momentum is zero after collision so momentum is conserved energy is dissipated thermally after collision OR the trolleys have kinetic energy before the collision which is transferred to thermal energy after the collision. momentum of trolleys is equal and opposite before collision / zero before collision/zero after collision.

Downloaded from www.merit-minds.com

Q2.

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**

Q3.

Downloaded from www.merit-minds.com

Question	Answer	Additional guidance	Mark
	explanation linking mass/(change of/initial/final) velocity/(change of) momentum (1) with a consistent equation linking chosen factor to force (1)	 accept speed/acceleration do not accept weight second marking point dependent on first marking point relevant equations are: $F = ma$ $F = \frac{mv - mu}{t}$ $F = \frac{\Delta p}{t}$ $F = \frac{m\Delta v}{t}$	**2 AO2.1**

Q4.

Downloaded from www.merit-minds.com

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)

Q5.

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

Downloaded from www.merit-minds.com