

Name of the Student: _____

Max. Marks : 18 Marks

Time : 18 Minutes

Mark Schemes

Q1.

	Answer	Additional guidance	Mark
	substitution (1) $(\Delta GPE =) 57 \times 10 \times 2.1$ evaluation (1) $(\Delta GPE =) 1200 (J)$	ignore attempts to convert kg to g for this MP only 1197 allow numbers that round to 1200 no ecf from MP1 award full marks for the correct answer without working.	(2) A02

Question number	Answer	Additional guidance	Marks
(i)	use of $\text{efficiency} = \frac{\text{useful energy transferred}}{\text{total energy supplied}}$ (1) substitution (1) $800 \div 2800$ answer (1) 0.29	allow 'input' for 'total energy' 2 marks for substituting correctly accept 28.6(%) / 29(%) / 30(%) / 28(%) 0.3 / 0.286... / 0.28 or 2/7 fraction award full marks for correct numerical answer without working	(3)

Question number	Answer	Additional guidance	Marks
(ii)	some light/radiation is reflected off the panels (1) OR idea that some energy arrives with unsuitable frequencies (1) OR (because some) energy is transferred into thermal stores (1)	accept 'because it/energy is reflected' e.g. infrared radiation / heat accept 'heat' for thermal accept 'form' for store ignore 'some energy is wasted'	(1)

Q3.

	Answer	Additional guidance	Mark
(i)	600 (j)	accept 3000 – 2400 accept -600	(1) AO3

	Answer	Additional guidance	Mark
(ii)	substitution (1) (efficiency =) $\frac{2400}{3000}$ evaluation (1) 0.8(0)	allow $\frac{4}{5}$ accept 80 (%) award full marks for the correct answer without working allow 1.25 for 1 mark for selecting and evaluating from the correct pair of values	(2) AO3

Question number	Answer	Additional guidance	Mark
	Substitution or rearrangement (1) $980 = 35 \times 10 \times h$	$(\Delta h =) \frac{\Delta GPE}{m \times g}$ or $(\Delta h =) \frac{980}{35 \times 10}$ allow use of 9.8 N/kg or 9.81 N/kg allow substitution into visible incorrectly rearranged algebraic expression	2 AO2.1
	evaluation (1) $(h =) 2.8 \text{ (m)}$	allow 2.85/2.86/2.9 for use of $g = 9.8$ N/kg or 9.81 N/kg ignore use of negative for decrease in GPE award full marks for the correct answer without working	

Question number	Answer	Additional guidance	Mark
(i)	substitution (1) $11 = 0.42 \times 10 \times \Delta h$ rearrangement (1) $(\Delta h =) \frac{11}{0.42 \times 10}$ evaluation (1) 2.6 (m)	accept substitution and rearrangement in either order $(\Delta h =) \frac{\Delta GPE}{m \times g}$ accept any value which rounds to 2.6 (m) award 2 marks for 2.6 to any other power of 10 allow 1 mark for 0.38 allow 1 mark for 46(.2) award full marks for the correct answer with no working give full credit for use of $g=9.8$ or 9.81 N/kg (gives 2.7 (m))	(3) AO2

Question number	Answer	Additional guidance	Mark
(ii)	substitution(1) $(KE =) \frac{1}{2} \times 0.42 \times 12^2$ evaluation (1) 30 (J)	allow 30.2(4) (J) award 1 mark for 30 240 (J) award 1 mark for 2.52 (J) award 1 mark for 60.5 (J) award full marks for the correct answer with no working	(2) AO2

Question number	Answer	Additional guidance	Mark
(iii)	A description including: KE/kinetic (energy store) (1) (transfers to) and one of: elastic (potential energy store) (1) OR thermal (energy of ball/wall/surroundings) (1) OR <u>dissipates</u> (to surroundings) (1)	allow mechanically / mechanical transfer ignore reference to gravitational potential energy allow heat for thermal allow sound in this context ignore reference to the ground	(2) AO2