

Name of the Student: _____

Max. Marks : 17 Marks

Time : 17 Minutes

Mark Schemes

Q1.

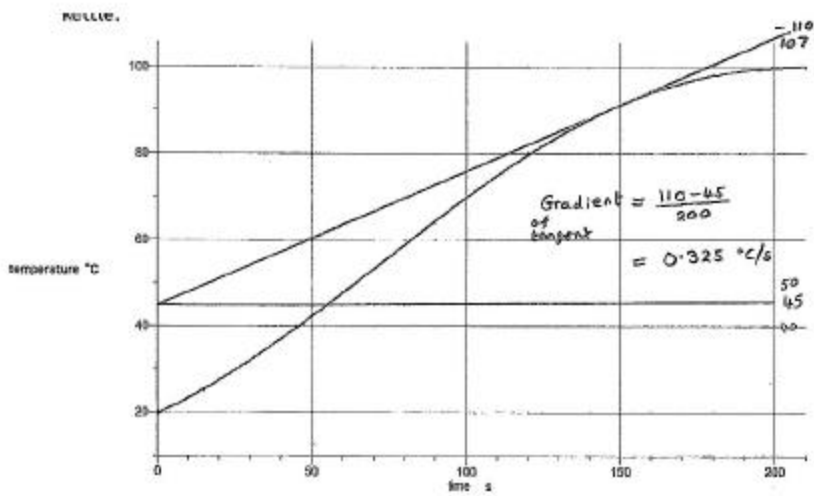
	Answer	Additional guidance	Mark
(i)	selection and substitution (1) $(KE) = \frac{1}{2} \times 3.6 \times 10^5 \times 71^2$ evaluation (1) $9.1 \times 10^8 \text{ (J)}$	accept $9.07 \times 10^8 \text{ (J)}$ accept 907 380 000 (J) award full marks for correct answer without working do not award a power of ten error	(2) AO2

	Answer	Additional guidance	Mark
(ii)	any one from: mechanically (to the thermal store) (1) (heating) due to air resistance / friction (1) thermally (1)	allow dissipated thermal (store) / heat (energy)	(1) AO2

Q2.

Question number	Answer	Additional guidance	Marks
(i)	recall K.E. = $\frac{1}{2} m v^2$ (1) rearrangement (1) (m =) $2 \times \text{K.E.} \div v^2$ substitution (1) (m =) $2 \times 960\,000 \div 40^2$ 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)

Q3.

Question number	Answer	Additional guidance	Mark
	 drawing tangent attempt (1) correct data points from graph (1) 60,60 and 150,92 evaluation (1) 0.33 ± 0.07 ($^{\circ}\text{C} / \text{s}$)	accept other data from the graph award full marks for the correct answer without working	(3)

Q4.

Question number	Answer	Additional guidance	Mark
	substitution (1)		3 AO2.1
	$(v^2) = \frac{950 \times 2}{35}$	$\frac{1900}{35}$	
	evaluation of v^2 (1) 54(.29)		
	evaluation of v (1) ($v =$) 7.4 (m/s)	accept values that round to 7.3 (m/s) or 7.4 (m/s)	
		accept answer of 7 (one sig. fig.) award 2 marks for an answer that rounds to 54 (m/s) if no other mark scored, allow 1 mark for an answer that rounds to 0.23 (m/s) (use of mass in g) award full marks for correct answer without working	

Q5.

Question number	Answer	Additional guidance	Mark
	rearrangement and substitution (1) energy supplied = $\frac{\text{useful energy}}{\text{efficiency}}$ $= \frac{3.3 \times 10^5}{0.91}$ evaluation (1) $3.6 \times 10^5 \text{ (J)}$	 (3.626×10^5) number that rounds to $3.6 \times 10^5 \text{ (J)}$ 3600 or 3626 scores 1 mark award full marks for the correct answer without working no marks for 91% of $3.3 \times 10^5 = 3.0 \times 10^5$ (J)	(2)