Name of the Student:_____

Max. **Marks : 20 Marks**

Time : 20 Minutes

Mark Schemes
Q1.

Question number	Answer	Mark
(a)	Idea of a direct reading (without calculation)	**(1)**

Question number	Answer	
(b)	If student B drops the ruler, they are not really measuring their own reaction time as they know when ruler has been dropped	**(1)**

Question number	Answer	Additional guidance	Mark
(c)(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)**

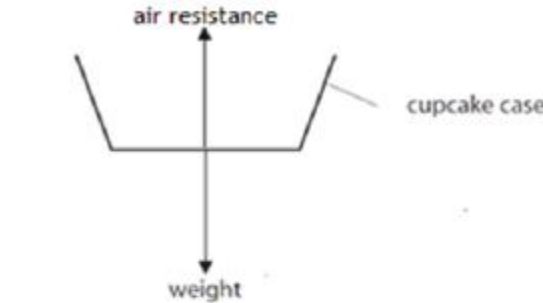| Question number	Answer	Additional guidance	Mark
(c)(ii)	Rearrangement (1) $t = \sqrt{\dfrac{\text{distance}}{500}}$ Substitution and answer (1) time = 0.17 (s)	award full marks for correct numerical answer without working allow answers which round to 0.17, e.g. 0.1673	**(2)**

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

Question number	Answer	Additional guidance	Mark
(f)	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)

Q2.

Question number	Answer	Additional guidance	Mark
(i)	A description to include any 4 from: measure height (1) measure time of fall (1) use (average) speed = distance /time (1) repeat with different number of cupcake cases in the stack/more cupcake cases (1) repeat **and** average time (of fall for each stack of cupcake cases) (1) plot a graph (speed of fall against number of cupcake cases dropped) (1)	allow 'keep same height' allow in this context hold against (fixed point) on metre rule allow 'time it' accept cupcakes for cupcake cases	(4) AO1

Question Number	Answer	Additional guidance	Mark
(ii)	substitution (1) (W=)0.005 x 10 evaluation (1) 0.05 (N)	5×10^{-2} (N) do not allow power of ten error award full marks for the correct answer with no working give full credit for use of g=9.8 or 9.81 N/kg	(2) AO2

Question number	Answer	Additional guidance	Mark
(iii)	air resistance arrow (1)	judge by eye any vertical upward arrow outside or inside the cupcake case ignore length of arrow arrow need not touch cupcake holder ignore label on arrow	(1) AO2

Question number	Answer	Additional guidance	Mark
(iv)	zero / there is none / 0 / it has no acceleration	ignore 'constant' ignore units	(1) AO2