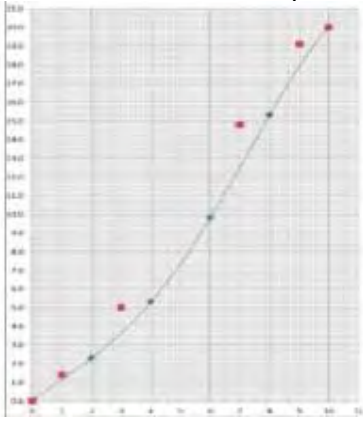
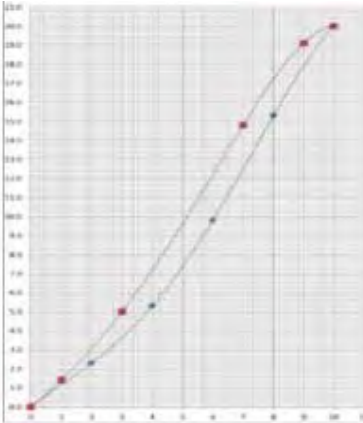


Question number	Answer	Notes	Marks
4 (a) (i)	upward force label = lift/eq; downward arrow drawn same size as up arrow; downward force arrow labelled as weight/eq;	allow upthrust (normal) reaction judge by eye do not accept unqualified 'gravity' ignore horizontal forces/arrows	(3)
(ii)	any two from: MP1. speed remains (almost) constant /does not reduce (as much); MP2. (because) friction reduced/eq; MP3. (because of cushion of) air lifts the car;	allow KE for speed RA allow for MP3 (because) the car does not touch the track Ignore idea that air pushes glider idea that speed increases unqualified 'travels further'	(2)
(b) (i)	(average) speed = $\frac{\text{distance}}{\text{time}}$;	accept standard abbreviations rearrangements	(1)
(ii)	substitution; evaluation; e.g. 8.3/0.314 26 (cm/s)	ignore the POT until evaluation 26.4 (cm/s)	(2)
(iii)	314 (ms) ;	Allow 0.314 s Accept answer in standard form, number and unit required Allow this mark if the working shows that time has been calculated by 8.3/26 (=0.319 or 0.32)	(1)

Total for Question 4 = 9 marks

Question number	Answer	Notes	Marks
10 (a) (i)	Any three of MP1. idea of (continuous) random movement; MP2. collisions / impact/eq with (inside) fabric/walls; MP3. idea that force is produced (by bombarding molecules); MP4. idea of pressure as force on an area;	ignore moves freely allow momentum or NIII argument	(3)
(ii)	any four from: MP1. pressure inside stays constant; MP2. pressure difference across the balloon fabric; MP3. (resultant) force acting down on the fabric; MP4. balloon fabric becomes concave / moves downwards; MP5. (free end of) pointer moves up;	allow for MP1, pressure increases slightly, for MP2 volume of air in can decreases, for MP5 end of pointer on the fabric moves down	(4)
(iii)	accept any two sensible suggestions e.g. longer stick/lever; narrower (diameter of) can; more stretchy material; less taut material;		(2)
(b) (i)	either it/the reading would decrease; OR (right end of) pointer goes down; OR left end of pointer goes up;		(1)
(ii)	more pressure inside the can ; plus any one from: particles inside can now move faster / have more KE; (hence) particles hit the balloon fabric more frequently; (hence) particles hit the fabric harder;	allow if seen in (i) look for idea of time implied more often allow momentum idea	(2)

Total for Question 10 = 12 marks

11 (b)(iii)	<p>4 points plotted correctly;; -1 for each incorrect point</p> 		(2)
(vi)	<p>best fit curve;</p> 		(1)
(v)	<p>a discussion to include any three points:</p> <p>MP1. does not obey Hooke's law; MP2. because graph is not linear throughout; MP3. Hooke's law requires extension directly proportional to force; MP4. it does show elastic behavior; MP5. because it returns to its original length; MP6. data points quoted to support other MP;</p>	<p>MP1 should only be awarded if there is an attempt at an explanation</p>	(3)

Total for Question 11 = 16 marks