

ForcesPast Paper Answers AQA Physics GCSE

Question	Answers	Extra information	Mark
1	Level 2: Relevant points (reasons / causes) are identified, given in detail and logically linked to form a clear account.		3-4
	Level 1: Point are identified and stated simply, but their relevance is not clear and there is no attempt at logical linking.		1-2
	No relevant content		0
	<p>Indicative content</p> <p>Factors</p> <ul style="list-style-type: none"> • poor condition of tyres • poor road surface • wet or icy road • poor/worn brakes <p>Explanation</p> <ul style="list-style-type: none"> • because of decreased friction <p>Factors</p> <ul style="list-style-type: none"> • increased mass of car/passengers <p>Explanation</p> <ul style="list-style-type: none"> • increases kinetic energy of car • more work needs to be done to stop car • increases momentum of the car <p>Factor</p> <ul style="list-style-type: none"> • road slopes downhill <p>Explanation</p> <ul style="list-style-type: none"> • (a component of) gravity opposes the braking force • resultant (braking) force is reduced <p>allow answers in terms of reducing braking distance throughout</p> <p>A single factor with no related explanation is insufficient to score a mark</p>		

2	resultant force = mass × acceleration		1
3	$7200 = 1600 \times a$ $a = \frac{7200}{1600}$ $a = 4.5 \text{ (m/s}^2\text{)}$	ignore negatives throughout	1 1 1
4	15 (m) 38 (m) = 53 (m)	two correct values identified allow the correct addition of a misread braking distance and /or a misread thinking distance taken from the graph	1 1
5	$p = \frac{F}{A}$		1
6	$120\,000 = \frac{60}{A}$ $A = \frac{60}{120\,000}$ $A = 0.0005$ $A = 5 (.0) \times 10^{-4}$ m^2	allow an answer given to 2 sig figs from an incorrect calculation using the given data	1 1 1 1 1

7	will return to its original shape/length		1
	when the force is removed	allow (when) the child gets off the second mark is dependent on scoring the first mark	1
8	Level 3: The method would lead to the production of a valid outcome. The key steps are identified and logically sequenced.		5–6
	Level 2: The method would not necessarily lead to a valid outcome. Most steps are identified, but the method is not fully logically sequenced.		3–4
	Level 1: The method would not lead to a valid outcome. Some relevant steps are identified, but links are not made clear.		1–2
	No relevant content		0
	Indicative content <ul style="list-style-type: none"> • set up a clamp stand with a clamp • hang the spring from the clamp • use a second clamp and boss to fix a (half) metre rule alongside the spring • record the ruler reading that is level with the bottom of the spring • hang a 1 N / a known weight from the bottom of the spring • record the new position of the bottom of the spring • calculate the extension of the spring • measure the extension of the spring • add further weights to the spring so the force increases 1 N at a time up to 5 N • for each new force record the position of the bottom of the spring and calculate / measure the extension 		
Indicative content continues on the next page...			

	<p><u>Risk Assessment</u></p> <p>Hazard: Clamp (stand, boss and masses) might fall off desk Risk: injury to feet Precaution: Use clamp to fix apparatus to the bench or Ensure that the slotted masses hang over the base/foot of the stand or Ensure that the boss is screwed tightly into the stand and clamp or Put (heavy) masses on the base/foot of the stand or Stand up so that you can move out of the way</p> <p>Hazard: Spring could break / come loose Risk: damage eye Precaution: Wear safety goggles</p> <p>If a risk assessment / hazard is not given, the answer can still reach level 3, but not full marks.</p> <p>Full marks may be awarded for alternative feasible methods.</p>		
9	force = spring constant × extension	1	
10	5.00 0.125	allow any correct pair of values from the graph	1
	$k = \frac{5.00}{0.125}$	allow a misread value(s) from the graph	1
	$k = 40 \text{ (N/m)}$	allow a correct calculation using their incorrect value(s)	1
11	the line is straight	allow the line does not curve	1
	and passes through the origin	allow a constant gradient	1

12	$e = 0.20 \text{ m}$		1
	$E_e = 0.5 \times 13 \times 0.20^2$	allow an incorrectly / not converted value of e	1
	$E_e = 0.26 \text{ (J)}$	use of two incorrectly/not converted values scores a maximum of 1 mark	1