Name of the Student:_____

Max. Marks : 19 Marks **Time : 19 Minutes**

Mark Schemes

Q1.

Question Number		Indicative Content	Mark
QWC	*	An explanation including some of the following points: • Statement of what is meant by stopping distance Factors affecting driver • factors affecting driver's thinking distance/reaction time Factors dependent on the car • factors affecting braking distance e.g. tyre tread, condition of brakes • cars may be carrying different loads • cars may have different masses External factors • road surface • weather • uphill / downhill Use of data • calculation of thinking, braking and or stopping distances for average driver • calculation of thinking, braking and or stopping distances for driver A • calculation of thinking, braking and or stopping distances for driver B	(6)

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Level	0	No rewardable content
1	1 - 2	• a limited explanation of the differences using one fact OR one piece of data from the chart OR factor(s) affecting thinking/braking distance. e.g. A has a longer thinking distance OR B is a longer braking distance OR thinking distance can be affected by a driver using their phone • the answer communicates ideas using simple language and uses limited scientific terminology • spelling, punctuation and grammar are used with limited accuracy
2	3 - 4	• a simple explanation, giving more than one fact using data from the chart about either car OR at least one piece of data about each OR using one piece of data from the chart about one car AND at least one factor affecting thinking/braking distance OR a statement linking data from the chart to the cause for one car but nothing correct about the other car e.g. A has a braking distance of (about) 33 m, its thinking distance is longer than an average car. OR B has a longer stopping distance. B's reaction time is faster than the Highway code. OR B has a very short thinking time. Car B's brakes may be worn out OR Driver A may have drunk alcohol making his reaction time slower. Car B has better brakes (NB 2nd sentence is incorrect) • the answer communicates ideas showing some evidence of clarity and organisation and uses scientific terminology appropriately • spelling, punctuation and grammar are used with some accuracy
3	5 - 6	• a detailed explanation linking data from the chart to the cause for one car AND at least one statement about the other OR two statements linking data from the chart to the cause for one car e.g. B has a braking distance of (about) 60 m. This means B might be on a wet road. A has a longer thinking distance. OR B has a shorter thinking distance than A. A has a longer thinking distance compared to the average (in highway code). He may be a drink driver. • the answer communicates ideas clearly and coherently uses a range of scientific terminology accurately • spelling, punctuation and grammar are used with few errors

Q2.

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Question Number	Answer	Additional guidance	Mark
(i)	(metre) rule(r) (1)	accept measuring tape/stick tape measure light gate	(1)

Question Number	Answer	Additional guidance	Mark
(ii)	A description that combines the following points to produce a logical method: hang/attach/add/put/increase {masses / weights} (1) on/to (the end of) the string (over the pulley wheel) (1) OR apply a force to the trolley /string (1) (by a) pull / push / rubber band (1) OR putting trolley on a slope (1) allow the trolley to run down (1)	accept on/at/from the pulley wheel ' pull the string' OR push the trolley scores 2 marks slanting the bench (let) gravity pull the trolley	(2)

Question Number	Answer	Additional guidance	Mark
(iii)	Any one from: speed (at the start/end of the run) (1) time (between changes in speed) (1)	(different/additional) speed / velocity appropriate ticker tape(s)	(1)

Q3.

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Question number	Indicative content	Mark
*	Answers will be credited according to candidate's deployment of knowledge and understanding of the material in relation to the qualities and skills outlined in the generic mark scheme. The indicative content below is not prescriptive and candidates are not required to include all the material which is indicated as relevant. Additional content included in the response must be scientific and relevant. **AO2** • fuel forms a store of chemical (potential) energy • chemical energy is transferred to kinetic energy and thermal energy when the car moves • kinetic energy transferred to thermal energy as the car slows down **AO3** • during X, kinetic energy increases as the car's speed increases/car accelerates and the increase in kinetic energy is provided by the chemical energy store • during all three sections, work is done against frictional forces in the moving parts of the car and against the drag from the air • during Y, kinetic energy stays constant when the car moves at constant speed but energy is still transferred to thermal energy • during Z, kinetic energy decreases as the car slows down	**(6)**

Level	Mark	Descriptor
	0	No awardable content.
1	1–2	• Interpretation and evaluation of the information attempted but will be limited with a focus on mainly just one variable. Demonstrates limited synthesis of understanding. (AO3) • The description attempts to link and apply knowledge and understanding of scientific ideas, flawed or simplistic connections made between elements in the context of the question. (AO2)
2	3–4	• Interpretation and evaluation of the information on both variables, synthesising mostly relevant understanding. (AO3) • The description is mostly supported through linkage and application of knowledge and understanding of scientific ideas, some logical connections made between elements in the context of the question. (AO2)

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3	5–6	• Interpretation and evaluation of the information, demonstrating throughout the skills of synthesising relevant understanding. (AO3) • The description is supported throughout by linkage and application of knowledge and understanding of scientific ideas, logical connections made between elements in the context of the question. (AO2)

Q4.

Question number	Answer	Additional guidance	Mark
	distance = area under graph (1) ½ × 7 × 15 (1) 52(.5) (m) (1)	attempt to find area seen on graph correct area(s) identified including calculation 53 (m) allow 7 × 15 or 105 for 1 mark only award full marks for the correct answer with no working	**(3)**

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