Mark Scheme

Q1.

Question Number	Answer	Additional guidance	Mark
	• direction (1) • size (1)	answers only acceptable in given order or magnitude	**(2)** AO 2 1

Q2.

	Answer	Acceptable answers	Mark
	substitution F = 1200 × 0.8 (1) evaluation (1) 960 (N)	full marks for correct answer with no working shown.	**(2)**

Q3.

Question Number	Answer	Additional guidance	Mark
	substitution (1) 1800 x 1.2 evaluation (1) 2200 (N)	accept 1800 kg x 1.2 m/s^2 reject 1800 x 1.2^2 2160 award full marks for the correct answer without working allow 1 mark total for 2200 OR 2160 with any other power of ten	**(2)**

Q4.

Question Number	Answer	Additional guidance	Mark
	substitution (1) 1800 x 1.2 evaluation (1) 2200 (N)	accept 1800 kg x 1.2 m/s^2 reject 1800 x 1.2^2 2160 (N) award full marks for the correct answer without working allow 1 mark total for 2200 OR 2160 with any other power of ten	**(2)**

Q5.

	Answer	Acceptable answers	Mark
	An explanation linking • {acceleration of sports is 2x / time to reach 30 m/s is ½} that of family car / RA (1) • mass of sports car LESS	Attempt to use f = m × a scores one mark e.g. 4200 <u>OR</u> 3600 scores 1 Correct numerical comparison scores both marks e.g. 4200:3600 numerically or in words scores 2 marks	**(2)**

	than ½ that of family car or RA (1) (so resultant force required is less)		

Q6.

	Answer	Acceptable answers	Mark
(i)	D the same size as the driving force		**(1)**
(ii)	transposition: (1) (change in) speed= acceleration×time substitution: (1) speed = 12 × 4 evaluation: (1) 48 (m/s) (1)	transposition and substitution can be in either order substitution mark can be scored when incorrectly transposed word/symbol equation is given Give full marks for correct answer no working	**(3)**

Q7.

	Answer	Acceptable answers	Mark
(i)	8 – 0 (m/s)	8	**(1)**
(ii)	substitution 8 / 5 (1) evaluation (1) 1.6 (m/s^2)	ecf from (i) full marks for correct answer (or ecf) with no working shown.	**(2)**
(iii)	0	Nil / nothing / zero / none (no mark for no response)	**(1)**

Q8.

Question Number	Answer	Additional guidance	Mark
	substitution (1) (F =) 0.10 x 2.0	100 x 2 (using 0.10kg = 100g) reject 0.10×2.0^2 and the follow up evaluation (equation given should be used)	**(3)** AO 2 1
	evaluation (1) 0.2(0)	correct answer without working gets 2 marks allow 1 mark total for 2 with any other power of ten, so that includes 200 for example	
	unit (1) N	separate unit mark newtons / Newtons accept lowercase 'n' for the abbreviated unit accept kg ms^{-2} accept 200 g ms^{-2} for 3 marks	

Q9.

	Answer	Acceptable answers	Mark
(a)(i)	B to the left ←		**(1)**
(a)(ii)	A accelerating		**(1)**
(a)(iii)	substitution 625x 10 (1) Evaluation 6250 (N) (1)	625 x 9.8 6125 (N) give full marks for correct answer, no working	**(2)**
(b)(i)	 (1) air resistance (1)	upward arrow on any part of line vertical line from any point on the diagram air friction, upthrust, drag Ignore any downward arrow labelled weight or gravity	**(2)**

(b)(ii)	Balanced (1) Zero (1)		**(2)**

Total for marks for question = 8

Q10.

Question Number	Answer	Acceptable answers	Mark
(ai)	**D** 150 m **(1)**		**(1)**

Question Number	Answer	Acceptable answers	Mark
(aii)	**B** at 7 s **(1)**		**(1)**

Question Number	Answer	Acceptable answers	Mark
(aiii)	6 (s) **(1)**		**(1)**

Question Number	Answer	Acceptable answers	Mark
(aiv)	Substitution: 15 ÷ 6 (1) Evaluation 2.5 (m/s^2) (1)	Allow ecf from 4(aiii) Must be 15 divided by their 4(aiii) ECF allowed from first marking point ie evaluation of 15 divided by their answer from 4(aiii) Award 2 marks for correct answer, no working	**(2)**

Question Number	Answer	Acceptable answers	Mark
(bi)	100 - 30 (1) 70 (N) (1)	100 + 30 or 130 gains 1 mark Award 2 marks for correct answer, no working	**(2)**

Question Number	Answer	Acceptable answers	Mark
(bii)	550 (N) (1)	539 (N) allow use of g = 9.8 N/kg 539.55 (N) for use of g = 9.81N/kg Award mark for correct answer, no working	**(1)**

Question Number	Answer	Acceptable answers	Mark
(c)	An explanation linking (combined) mass is less (1) smaller force required for same acceleration OR more acceleration from same force (1)	ignore references to weight, friction or backwards force ignore "easier to accelerate" as in stem less force needed (to accelerate)	**(2)**

(Total for Question =10 marks)