

- 1 (a)(i) distance/time or rate of change of distance B1
- (ii) (change in)displacement/time or rate of change of displacement B1
- (iii) scalar has a magnitude only e.g. speed B1
vector has magnitude and a direction e.g. velocity B1
- (b)(i) velocity B1
travels in two opposite directions or equivalent words / increasing and decreasing displacement B1
- (ii) Z any peak or trough / A / B / 0 / 3.0 / 6.0s B1
M any point where gradient is a maximum (1.0 – 1.6 or 4.4 – 5.0 s)B1
If M and Z are given on Fig.1.1 then max 1
- (iii) tangent to curve drawn B1
values given correct from graph C1
answers correct for maximum in range of 1.3 to 1.5 A1
TOTAL [11]
- 2 (a) weight = $28 \times 9.8 / \text{mg}$ C1
 $= 270 \text{ (N)}$ (274.4) A1
(using $g = 10$ then -1)
- (b) a completed triangle drawn with correct orientation B1
at least two labels for triangle with correct directions given B1
- calculation: force P / weight = $\tan 35$ C1
force P = 192 (N) A1
- scale diagram: scale given C1
185 to 200 (N) A1
- (c) tension is greater B1
(reference to triangle) tension force would be greater (longer) as the holding force P would be larger (longer) for greater angle / larger value needed so vertical component still balances the weight B1
TOTAL [8]
- 3 (a)(i) horizontal velocity = $25\cos 30$ B1
 $= 21.65 \text{ (m s}^{-1}\text{)}$ A0
- (ii) vertical velocity = $25\sin 30$ C1
 $= 12.5 \text{ (m s}^{-1}\text{)}$ allow 13 (2 sig. fig.) A1
- (b)(i) straight line with positive gradient through 0,0

5	(a)(cont)		
	copper:	ductile ductile explained as can be formed into a wire initially elastic plastic where it stretches more and more with little increase in stress plastic explained as does not return to its original length when the load is removed reference to necking at the end	MAX 3
	polythene:	easy to deform / deformed with a small force plastic ductile polymeric	MAX 2
			MAX 8
	QWC:	spelling, punctuation and grammar organisation and logic	B1 B1
6	(a)(i)	motive force is the frictional force generated between the tyres and road that acts on the car in the direction of travel / force provided by the engine (to enable the vehicle to move forward).	B1
	(ii)	air resistance / drag acts against the motive force drag equals / balances the motive force	B1 B1
	(iii)	power = Fv = 500×25 = 12500 (W)	C1 A1
	(b)(i)	distance = 25×0.62 = 15.5 (m)	C1 A1
	(ii)	1. braking distance = $75 - 15.5 = 59.5 \text{ (m)}$	A1
	note ecf from (b)(i)		
	2.	$0 = (25)^2 + 2a \ 59.5$ $a = -(25)^2 / 2 \times 59.5$ = $(-) \ 5.25$	C1 A1
		unit = m s^{-2}	B1
	note ecf from (b)(ii)		
			TOTAL [11]