Mechanics 1 Modelling Answers

3(a)(i)	$s = ut + \dfrac{1}{2}at^2$				
	$25 = 0 + 4.9t^2$	M1		full method	
	$t = 2.26\,\text{sec}$ $(2.236)(\text{if } g = 10)$	A1	2		
	(2.259)				
(ii)	$v^2 = u^2 + 2as$				
	$v^2 = 0 + 2 \times 9.8 \times 25$	M1			
	$v = 22.1\,\text{ms}^{-1}$ (21.913)	A1	2		
	(22.14)				
(b)	(Time longer) air resistance slows down motion, links with motion, no contradictions	M1 A1	2	(or Time less) package large so less distance to travel	
	Total		**6**		

1(a)	$s = 0 + \dfrac{1}{2} \times 9.8 \times 4^2$	M1 A1		Full method Correct subs, accept ±9.8	
	$s = 78.4$ metres	A1	3	CAO (need positive)	
(b)	Average speed $= \dfrac{78.4}{4}$	M1		Also accept full method with use of velocities at $t = 0$ and 4, or at $t = 2$	
	$= 19.6\text{ ms}^{-1}$	A1F	2	FT distance	
(c)	Only force acting is weight	B1	1	Acc resistance forces negligible or ignored, (not friction, or air friction)	
	Total		**6**		

(d)	You would expect P to vary with the speed of the car.	B1	1	Correct explanation	

(iv)	Reduce a, as the air resistance would reduce the magnitude of the resultant force or because the air resistance increases as the velocity increases towards its terminal value	B1 B1	2	Reduces Explanation Second B1 dependent on the first B1 mark	