

Question number	Answer	Notes	Marks
4 (a) (i)	momentum = mass $\times$ velocity;	all standard symbols and rearrangements e.g. $m = p / v$ ignore m, M for momentum	1
(ii)	substitution; rearrangement; evaluation to 2 or more s.f.;  e.g. $1100 = \text{mass} \times 14$ $\text{mass} = 1100 / 14$ (mass =) 79 (kg)	answer of 78 (kg) gets 2 marks only  <b>allow 78.6, 78.57...</b> condone 78.5	3
(b)	<b>substitution into <math>F = \Delta p / t</math>;</b>  rearrangement; evaluation;  e.g. $15\,000 = 1100 / t$ $t = 1100 / 15\,000$ (t =) 0.073 (s)	ignore not converting kN to N allow use of <b><math>\Delta p = (80 \times 14 =) 1120</math></b>  <b>-1 for POT error</b>  <b>allow 0.07, 0.0733..., 0.075, 0.0746...</b>	3
(c)	idea that airbag increases the (collision) time; reduces the rate of change of momentum;	condone slows down change of momentum  allow reduces acceleration  allow use of equation AND statement that change in momentum is constant (which reduces the force)	2

Total for Question 4 = 9 marks