

Question Number	Answer	Mark
17(a)(i)	<p>Use of $p = m v$ (1)</p> <p>Use of conservation of momentum (1)</p> <p>$m = 151$ (kg) (1)</p> <p>Use of $F = \Delta p / \Delta t$ scores MP1 and MP2</p> <p><u>Example of calculation</u></p> $p = 250 \text{ kg} \times 2.10 \text{ m s}^{-1} = 250 \text{ kg} \times 1.15 \text{ m s}^{-1} + m \times 1.57 \text{ m s}^{-1} = 525.0 \text{ kg m s}^{-1}$ $m = (525.0 - 287.5 \text{ N s}) \text{ kg m s}^{-1} \div 1.57 \text{ m s}^{-1}$ $= 237.5 \text{ kg m s}^{-1} \div 1.57 \text{ m s}^{-1} = 151.3 \text{ kg}$	3
17(a)(ii)	No external horizontal forces acted on either car during the collision. (1)	1
17(a)(iii)	<p>Use of $a = \Delta v / \Delta t$ (1)</p> <p>Use of $\Sigma F = ma$ (1)</p> <p>$\Sigma F = 1.76 \times 10^2 \text{ N}$ (ecf from (a)(i)) (1)</p> <p><u>Example of calculation</u></p> <p>average acceleration = $1.57 \text{ m s}^{-1} \div 1.35 \text{ s} = 1.16 \text{ m s}^{-2}$</p> <p>$\Sigma F = 151.3 \text{ kg} \times 1.16 \text{ m s}^{-2} = 1.76 \times 10^2 \text{ N}$</p>	3
17(b)	<p>P exerts a force on Q so Q exerts a force on P (1)</p> <p>Due to N3 forces are equal and opposite in direction (1)</p> <p>Resultant force on P opposite to direction of motion so according to N2, P decelerates (1)</p>	3
Total for question 17		10