Question Number	Answer	Mark
11(a)	Use of $p = mv$ **(1)** $p = 4.53 \times 10^5$ (kg m s^{-1}) **(1)** (reverse calculation can gain both marks) Example of calculation $p = mv$ $p = (7.15 + 5.35) \times 10^4$ kg $\times$ 3.62 m s^{-1} = 4.53$\times$ 10^5 kg m s^{-1}	**2**
11(b)	Equates the initial with the final momentum. **(1)** v = 2.44 m s^{-1} (allow ecf from (a)) **(1)** Example of calculation 5.35$\times$ 10^4 kg $\times$ v + 7.15 $\times$ 10^4 kg $\times$ 4.50 m s^{-1} = 4.53$\times$ 10^5 kg m s^{-1} v = (4.53$\times$ 10^5 kg m s^{-1} − 7.15 $\times$ 10^4 kg $\times$ 4.50 m s^{-1})/ 5.35$\times$ 10^4 kg = 2.44 m s^{-1}	**2**
11(c)	Use of $E_K = ½ m v^2$ **(1)** E_K = 6.5 $\times$10^4 J (allow ecf from (b)) **(1)** Example of calculation Initial k.e. = 0.5 $\times$(7.15 $\times$ 10^4 kg $\times$(4.50 m s^{-1})^2 + 5.35$\times$ 10^4 kg $\times$ (2.44 m s^{-1})^2) = 8.84 $\times$10^5 J Final k.e. = 0.5$\times$12.5 $\times$ 10^4 kg $\times$ (3.62 m s^{-1})^2) = 8.19 $\times$10^5 J Difference = 8.84 $\times$10^5 J − 8.19 $\times$10^5 J = 6.47 $\times$10^4 J	**2**
	Total for question 11	**6**