Question Number	Answer		Mark
15ai	Use of $F\Delta t = \Delta p$ and $p = mv$ **Or** Use of $F = ma$ and $v = at$ $v = 42$ m s^{-1} Example of calculation $109000\ \text{N} \times 2.9\ \text{s} = 7500\ \text{kg} \times v$ $v = 42$ m s^{-1}	(1) (1)	**2**
15aii	Use of $E_k = ½\ mv^2$ (ecf for v from part ai) Use of $\Delta E_{grav} = mg\Delta h$ It reaches the top of the tower as initial $E_k = 6.6 \times 10^6$ J is greater than energy required, $\Delta E_{grav} = 6.0 \times 10^6$ J **Or** It reaches the top of the tower as it can reach a height of 90 m which is greater than the required 81 m **Or** It reaches the top of the tower because 42 m s^{-1} is greater than the required speed of 40 m s^{-1} **Or** It reaches the top of the tower because speed at top is 13 m s^{-1} so it is still moving (Do not award marks for use of equations of motion for uniform acceleration) Example of calculation $E_k = \frac{7500\text{kg} \times (42\ \text{ms}^{-1})^2}{2}$ $E_k = 6.6 \times 10^6$ J $\Delta E_{grav} = 7500$ kg $\times 9.81$ m s$^{-2} \times 81$ m $= 6.0 \times 10^6$ J Use of show that gives $E_k = 6.0 \times 10^6$ J	(1) (1) (1)	**3**
15b	There is a change in flux linkage of the magnetic field and the metal fin **Or** The fin cuts magnetic field/flux This induces an emf (across the fin) Current is produced in the fin (accept eddy current) Force acts on the fin, as there is a current in a magnetic field **Or** field due to current in fin interacts with field due to magnets to cause force on fin The force opposes the motion due to Lenz's law **Or** Energy dissipated by current comes from (reduction in) kinetic energy of vehicle	 (1) (1) (1) (1) (1)	**5**
	Total for question 15		**10**