Question Number	Answer		Mark
18ai	Use of $v = s/t$	(1)	**3**
	Use of $p = mv$	(1)	
	$p = 0.32$ (N s)	(1)	
	Example of calculation		
	$v = 0.15$ cm / 0.19 s = 0.79 m s^{-1}		
	$p = 0.40$ kg × 0.79 m s^{-1} = 0.32 N s		
18aii	Use of $E_k = \frac{1}{2}mv^2$ **Or** $E_k = \frac{p^2}{2m}$	(1)	**3**
	Final E_k = 0.9 × Initial E_k **Or** correct use of $E_k \propto v^2$ can be awarded MP1 and 2	(1)	
	At lightgate 2 $v = 0.75$ m s^{-1} allow ecf from (i) 'show that' value gives $v = 0.71$ m s^{-1}	(1)	
	Example of calculation		
	Initial $E_k = ½ \frac{0.32^2 \text{ (N s)}^2}{0.4 \text{ kg}} = 0.125$ J		
	Final $E_k = 0.9 \times 0.125$ J = 0.1125 J = ½ 0.4 kg × v^2		
	$v = 0.75$ m s^{-1}		
18bi	**Max 2 marks from**		**2**
	e.m.f. induced (in plate)	(1)	
	due to change of flux linkage **Or** due to cutting of lines of flux **Or** due to cutting of magnetic field lines	(1)	
	(Leads to current in plate) as the plate provides a (full) conducting path	(1)	
18bii	**Either**		**2**
	Current carrying conductor within a magnetic field experiences a force	(1)	
	Force opposite to direction of motion due to Lenz's law (so kinetic energy is reduced)	(1)	
	Or		
	Energy dissipated by current (in plate) (according to $P = I^2R$)	(1)	
	Energy is conserved (so kinetic energy decreases)	(1)	

18ci	Calculates a relevant ratio for a pair of values in the table Shows the ratio is consistent with at least one other pair of values <u>Example of calculation</u> k = 10/0.5 = 20 k = 16/0.8 = 20 k = 22/1.1 = 20	(1) (1)	**2**