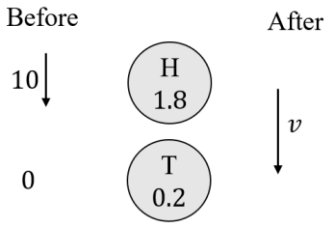
QUESTION NUMBER	SCHEME	MARKS
3		
3(a)	$10\times1.8=(0.2+1.8)v$	M1
	v = 9 (positive)	A1
		(2)
3(b)	For tent peg, $I=\pm0.2(v-0)$ or For hammer, $-I=\pm1.8(v-10)$	M1 A1
	1.8 Ns **OR** 1.8 kgms^{-1} units needed.	A1
		(3)
3(c)	$0=9^2+2a(0.12)$ **OR** $0=9^2-2a(0.12)$	M1A1
	$2g-R=2a$ $R-2g=2a$	M1 A1
	$R=690$ or 695	A1
		(5)
	N.B. Using u =10 for 9 can score M0A0M1A1A0 max	
	Using s = 12, can score M1A0M1A1A0 max	**(10)**
ALT 1	$0.12=\frac{(9+0)}{2}t$	M1A1
	$(R-2g)t=2\times9$	M1A1
	$R=690$ or 695	A1
ALT 2	$0.12R=\frac{1}{2}\times2\times9^2+2g\times0.12$	M2A2
	$R=690$ or 695	A1
	Notes for question 3	
(a)		
M1	Forms CLM equation, condone sign errors and extra g's and any correct cancellation	
A1	cao	
(b)		
M1	Impulse-momentum equation, dimensionally correct, correct no. of terms. Condone sign errors. **N.B**. M0 if g is included.	
A1	A1 correct unsimplified equation	
A1	A1 cao must include units.	
(c)		
M1	Equation formed to find the acceleration. Must be dimensionally correct and have the correct no. of terms.	
A1	Correct unsimplified equation. Note $a=-337.5$	

M1	Use of $F=ma$. Must be dimensionally correct and have the correct no. of terms.	
A1	Correct equation, a does **not** need to be substituted but should be consistent with their a from first equation. **N.B.** Use the equation for a to **define** the positive direction.	
A1	cao	
	ALT 1	
M1	Equation(s) formed to find the time	
A1	Correct unsimplified equation. Note $t = \frac{2}{75} = 0.02666..$	
M1	Use of imp-mom equation. Must be dimensionally correct and have the correct no. of terms.	
A1	Correct equation, t does **not** need to be substituted but should be consistent with their t from first equation.	
A1	cao	
	ALT 2	
M2	Use of work-energy equation. Must be dimensionally correct and have the correct no. of terms.	
A2	Correct unsimplified equation, -1 each error.	
A1	cao	