

Year 1 Applied Chapter: Forces and Motion – Scale Pens
Exam Questions (Total Marks 19)

Q1.

Question Number	Scheme	Marks
(a)	For crate, $55g - 473 = 55a$ $a = 1.2 \text{ m s}^{-2}$	M1 A1 A1 (3)
(b)	For system, $55g + 200g \pm T - 150 = 255a$ Magnitude = 2040 N or 2000 N OR For lift, $200g + 473 - 150 \pm T = 200a$ Magnitude = 2040 N or 2000 N	M1 A2 A1 M1 A2 A1 (4)
7		
	Notes	
(a)	M1 for an equation in a only, with usual rules. First A1 for a correct equation Second A1 for $1.2 \text{ (m s}^{-2}\text{)}$. Allow $-1.2 \text{ (m s}^{-2}\text{)}$ if appropriate	
(b)	M1 for an equation, in T and a , for the system or the lift only, with usual rules. (a does not need to be a numerical value) A2 (-1 each error) for a correct equation (Allow $\pm T$). We do not need to see a numerical value for a . Third A1 for 2040 (N) or 2000 (N) N.B. In both parts of this question use the mass which is being used to guide you as to which part of the system is being considered.	

Q2.

Question Number	Scheme	Marks
(a)	For system, $(\uparrow), T - 950g - 50g = 1000 \times -2$ $T = 7800 \text{ N}$	M1 A1 A1 (3)
(b)	For woman, $(\uparrow), R - 50g = 50 \times -2$ $R = 390 \text{ N}$	M1 A1 A1 (3) [6]
Notes for Question		
Q (a)	(In both parts, use the <i>mass</i> to decide which part of the system is being considered and M marks can only be scored if an equation contains only forces acting on that part of the system) M1 is for a complete method for finding <i>T</i> i.e. for an equation in <i>T only</i> , dimensionally correct, with the correct number of terms. First A1 for a correct equation. Second A1 for 7800 (N).	
Q (b)	M1 is for a complete method for finding <i>R</i> i.e. for an equation in <i>R only</i> , dimensionally correct, with the correct number of terms. First A1 for a correct equation. Second A1 for 390 (N). N.B. Equation for lift <i>only</i> is: $T - 950g - R = 950 \times (-2)$	

Q3.

Question Number	Scheme	Marks
	$T - 0.5g = 0.5a$ $15 - T - 0.75g = 0.75a$ (OR: $15 - 0.5g - 0.75g = 1.25a$) $(a = 2.2 \text{ m s}^{-2})$ $T = 6 \text{ N}$	M1 A1 M1 A1 M1 A1 6
Notes		
	First M1 for an equation of motion for either <i>P</i> or <i>Q</i> with usual rules i.e. correct no. of terms, dimensionally correct but condone sign errors First A1 for a correct equation (allow <i>T</i> replaced by $-T$ and/or <i>a</i> replaced by $-a$) Second M1 for another equation of motion (for either <i>P</i> or <i>Q</i> or whole system) with usual rules as above Second A1 for a correct equation (allow <i>T</i> consistently replaced by $-T$ and/or <i>a</i> consistently replaced by $-a$) Third M1 for solving two THREE term equations of motion for <i>T</i> Third A1 for 6 (N). Must be positive but allow a change from -6 to 6, if they have consistently used $-T$ instead of <i>T</i> .	

