

Question			Answer	Marks	AO	Guidance
12	(a)		Weight = $-2g\mathbf{j}$ N [ $= -19.6\mathbf{j}$ N]	B1	2.5	Allow equivalent column vectors in all part questions
				[1]		
12	(b)		horizontal force $3\mathbf{i}$ Newton's second law $(-4\mathbf{i} + 12\mathbf{j}) + 3\mathbf{i} - 19.6\mathbf{j} = 2\mathbf{a}$ $\mathbf{a} = -0.5\mathbf{i} - 3.8\mathbf{j} \text{ m s}^{-2}$	B1  M1 A1	3.3  1.1a 1.1b	May be implied by correct resultant force  Must be vector equation. allow one missing or incorrect force. ISW if the magnitude is also given
			<b>Alternative method</b> Horizontal motion $-4 + 3 = 2a_x$ Vertical motion $12 - 19.6 = 2a_y$  $\mathbf{a} = -0.5\mathbf{i} - 3.8\mathbf{j} \text{ m s}^{-2}$	B1  M1  A1		3 N force used in the horizontal equation and not used in the vertical equation Considers motion in two directions. Allow one missing or incorrect force ISW if the magnitude is also given
				[3]		
12	(c)		$\mathbf{v} = \mathbf{u} + \mathbf{a}t$ $= 5\mathbf{i} + (-0.5\mathbf{i} - 3.8\mathbf{j}) \times 4$  $= 3\mathbf{i} - 15.2\mathbf{j} \text{ m s}^{-1}$	M1  A1	1.1a  1.1b	Using <i>suvat</i> equation(s) leading to a vector $\mathbf{v}$ . Do not award if scalar added to vector  Mark final answer. Must be vector $\mathbf{v}$ and not speed. FT their vector acceleration
				[2]		
12	(d)		constant velocity is equilibrium  so $(\mathbf{i} + 7.6\mathbf{j})$ N	B1	1.1b	Cao. ISW if the magnitude is also given
				[1]		