

Question Number	Scheme	Marks
6.(a)	$(4\mathbf{i} - 6\mathbf{j}) + (p\mathbf{i} + q\mathbf{j}) = (4+p)\mathbf{i} + (q-6)\mathbf{j}$	M1
	$\frac{(4+p)}{(q-6)} = \frac{2}{1}$ or $-\frac{2}{1}$ (or $\frac{1}{2}$ or $-\frac{1}{2}$)	DM1 A1
	$2q - 12 = 4 + p$	
	$p - 2q = -16$ GIVEN ANSWER	DM1 A1 (5)
(b)	$q = 3 \Rightarrow p = -10$	B1
	EITHER $0.5\mathbf{a} = -6\mathbf{i} - 3\mathbf{j}$ OR $ \mathbf{R} = \sqrt{(-6)^2 + (-3)^2}$	M1
	$\mathbf{a} = -12\mathbf{i} - 6\mathbf{j}$	$= \sqrt{45}$ oe
	$ \mathbf{a} = \sqrt{(-12)^2 + (-6)^2}$	$0.5\mathbf{a} = \sqrt{45}$
	$a = \sqrt{180} = 13.4\text{ms}^{-2}$	$a = \sqrt{180} = 13.4\text{ms}^{-2}$
(c)	e.g. $\tan \theta = \frac{12}{6} \Rightarrow \theta = 63.4^\circ$	M1A1
	Bearing $= 180^\circ + 63.4^\circ = 243^\circ$ (nearest degree)	A1cao (3)
	(13)	
	Notes for Qu 6	
	Allow column vectors throughout	
6(a)	First M1 for adding the two forces, with \mathbf{i} 's and \mathbf{j} 's collected, seen or implied Second DM1, dependent on first M1, for an equation in p and q only. Allow $\frac{1}{2}$ or $-\frac{1}{2}$ or $-\frac{2}{1}$ instead of $\frac{2}{1}$ First A1 for a correct equation in any form Third DM1, dependent on the second M1, for (at least)one correct intermediate line of working Second A1 for correct given answer	
6(b)	B1 for $p = -10$ seen or implied EITHER First M1 for use of $\mathbf{F} = 0.5\mathbf{a}$ with their <u>resultant force (must be a sum of the two forces)</u> First A1 for $\mathbf{a} = -12\mathbf{i} - 6\mathbf{j}$ Second M1 (independent) for finding magnitude of their \mathbf{a} Second A1 for $\sqrt{180}$ oe or 13.4 or better	