Question Number	Scheme	Marks
3		
(a)	$(2p\mathbf{i}-3p\mathbf{j})+(q\mathbf{i}+\mathbf{j})+(3\mathbf{i}-q\mathbf{j})=(2p+q+3)\mathbf{i}+(-3p+1-q)\mathbf{j}$	M1
	Correct method using the direction vector $4\mathbf{i}-5\mathbf{j}$ to form an equation in p and q only	M1
	$\dfrac{2p+q+3}{-3p+1-q}=\dfrac{4}{-5}$	A1
	Working that leads to $2p-q=19$ *	A1 *
		(4)
(b)	$q=-5$	B1
	N2L in vector form	M1
	$(14-5+3)\mathbf{i}+(-21+1+5)\mathbf{j}=0.5\mathbf{a}$	A1
	$\mathbf{a}=(24\mathbf{i}-30\mathbf{j})\quad\left(\text{ms}^{-2}\right)$	A1
		(4)
		(8)
	Notes for Question 3 **Accept column vectors throughout**	
3(a)		
M1	Find the sum of the three forces and collect **i**'s and **j**'s	
M1	Use the direction vector $4\mathbf{i}-5\mathbf{j}$ correctly with their **i** and **j** components to form an equation in p and q only. Accept equivalent forms. May use $(2p+q+3)\mathbf{i}+(-3p+1-q)\mathbf{j}=\lambda(4\mathbf{i}-5\mathbf{j})$ and equate components to form an equation in p and q. M0 if equation is formed from simultaneous equations.	
A1	Correct unsimplified equation in p and q	
A1*	Obtain the given answer from complete and correct working. Must see at least one line of working between the initial equation in p and q and the given answer. Accept $19=2p-q$	
3(b)		
B1	Correct value for q	
M1	Use of $\mathbf{F}=m\mathbf{a}$ (vector form) with $p=7$ and their q substituted. Must use the resultant force (vector sum of $\mathbf{F}_1$, $\mathbf{F}_2$ and $\mathbf{F}_3$) correctly with $m\mathbf{a}$. M0 for using $\lvert\mathbf{F}\rvert=m\lvert\mathbf{a}\rvert$. M0 if weight is included as a force.	
A1	Correct unsimplified vector equation	
A1	Correct acceleration vector. ISW if Pythagoras is used to find $\lvert\mathbf{a}\rvert$ *after* finding acceleration vector.	