Question Number	Scheme	Marks
6(a)	Magnitude = $\sqrt{10^2+1^2} = \sqrt{101}$ (N)	M1A1
		(2)
6(b)	$\tan\alpha = \frac{1}{10}$	M1
	$45°$	B1
	Angle $= 45° - \alpha = 39.289\ldots$ Accept $39°$ or better	M1 A1 (4)
	ALTERNATIVE 1 Scalar Product	
	$(10\mathbf{i}+\mathbf{j}).(\mathbf{i}+\mathbf{j}) = \sqrt{10^2+1^2}.\sqrt{1^2+1^2}\cos\theta$	M1
	$(10\mathbf{i}+\mathbf{j}).(\mathbf{i}+\mathbf{j}) = 11$	B1
	$11 = \sqrt{10^2+1^2}.\sqrt{1^2+1^2}\cos\theta$	M1
	$\theta = 39^O$ *or better*	A1 (4)
	ALTERNATIVE 2 Cosine Rule	
	$(10^2+1^2)+(1^2+1^2)-2\sqrt{10^2+1^2}.\sqrt{1^2+1^2}\cos\theta$	M1
	$(10\mathbf{i}+\mathbf{j})-(\mathbf{i}+\mathbf{j}) = 9\mathbf{i}$ or $(\mathbf{i}+\mathbf{j})-(10\mathbf{i}+\mathbf{j}) = -9\mathbf{i}$	B1
	$9^2 = (10^2+1^2)+(1^2+1^2)-2\sqrt{10^2+1^2}.\sqrt{1^2+1^2}\cos\theta$	M1
	$\theta = 39^O$ *or better*	A1 (4)
6(c)	$(10\mathbf{i}+\mathbf{j}) + (-15\mathbf{i}+a\mathbf{j}) = -5\mathbf{i}+(a+1)\mathbf{j}$	B1
	$\frac{a+1}{-5} = \frac{-3}{2}$	M1A1
	Solve for a	M1
	$a = 6.5$	A1
		(5)
		(11)
	Notes for question 6	
6(a)	M1 Use of Pythagoras	
	A0 if they *only* give a decimal	
6(b)	M1 For any relevant trig ratio for α or $(90°-\alpha)$	
	B1 $45°$ seen	
	M1 Finding the difference between $45°$ and α or $(90°-\alpha)$ and $45°$	
	A1 Accept $39°$ or better	
6(c)	B1 Adding the two forces **and** collecting **i**'s and **j**'s. Seen or implied.	
	M1 For producing an equation in *a only* e.g. using ratios from their resultant (M0 if no resultant attempted and M0 if equation comes from *equating* their resultant to (2**i** – 3**j**). Condone sign error but M0 if ratio is upside down.	
	A1 Correct equation in a only	
	M1 Solve for a . This is an independent M mark but their equation must have come from a ratio equation obtained from using their resultant	
	A1 $a = 6.5$	