Question Number	Scheme	Marks
6(a)	$\overrightarrow{PQ} = (7\mathbf{i}+5\mathbf{j})-(5\mathbf{i}-3\mathbf{j}) = (2\mathbf{i}+8\mathbf{j})$ $PQ = \sqrt{2^2+8^2} = \sqrt{68} = 8.2$ or better	M1 M1 A1 (3)
(b)	$\mathbf{r}_P = (5\mathbf{i}-3\mathbf{j})+t(2\mathbf{i}+5\mathbf{j}) = (2t+5)\mathbf{i}+(5t-3)\mathbf{j}$	M1 A1 (2)
(c)	$\mathbf{r}_Q = (7\mathbf{i}+5\mathbf{j})+t(-3\mathbf{i}-15\mathbf{j}) = (7-3t)\mathbf{i}+(5-15t)\mathbf{j}$	A1 (1)
(d)	$(2t+5) = (7-3t) \Rightarrow t = \frac{2}{5}$ $(5t-3) = (5-15t) \Rightarrow t = \frac{2}{5}$ time is 2.24 pm Allow just $t = 0.4$	M1 A1 M1 A1 A1 (5)
(e)	$\mathbf{r}_P = (5.8\mathbf{i}-\mathbf{j})$	M1 A1 (2) **13**
	Notes **Allow column vectors throughout.**	
6(a)	First M1 for clear attempt to subtract in either order. Condone missing brackets. Second M1 for attempt to find magnitude of their **PQ** or **QP** A1 $\sqrt{68}$, $2\sqrt{17}$ or 8.2 or better	
(b)	M1 for (either $\mathbf{r}_P$ or $\mathbf{r}_Q$) a clear attempt at: (M0 if they use $(t + 2)$) $\mathbf{r}_P = (5\mathbf{i}-3\mathbf{j})+t(2\mathbf{i}+5\mathbf{j}) = (2t+5)\mathbf{i}+(5t-3)\mathbf{j}$ A1 if correct (**i**'s and **j**'s do not need to be collected.)	
(c)	A1 for $\mathbf{r}_Q = (7\mathbf{i}+5\mathbf{j})+t(-3\mathbf{i}-15\mathbf{j}) = (7-3t)\mathbf{i}+(5-15t)\mathbf{j}$	
(d)	First M1 for equating coefficients of **i** (coeffs. of form $a + bt$) First A1 for $t = 2/5$ Second M1 for equating coefficients of **j** (coeffs. of form $a + bt$) Second A1 for $t = 2/5$ Third A1 for 2.24 (pm) , dependent on *both* previous M marks	
(e)	This answer must appear in part (e). M1 for substituting their t value (allow even if they have only equated coefficients once to obtain it) into their $\mathbf{r}_P$ or $\mathbf{r}_Q$ expression A1 for $\mathbf{r}_P = (5.8\mathbf{i}-\mathbf{j})$	