10	**(i)**		$4\sin 2\theta = 6\sin\theta$ $8\sin\theta\cos\theta = 6\sin\theta$ $\cos\theta = \frac{3}{4} \Rightarrow \theta = 41.4^{\circ}$	**B1** **M1** **A1** **A1** **[4]**	**3.3** **3.1a** **1.1** **2.2a**	E E E C	Resolving horizontally Use of double angle formulae **AG**	 41.409622…
10	**(ii)**		$P = 4\cos 2\theta + 6\cos\theta$ $P = 5$	**M1** **A1** **[2]**	**3.3** **1.1**	E E	Resolving vertically – allow sin/cos errors Accept 5.002 or better	
10	**(iii)**	**(a)**	$3\sin\theta$ and $P - 3\cos\theta$ $\sqrt{(3\sin\theta)^2 + (P - 3\cos\theta)^2}$ Magnitude is 3.39 N	**B1** **M1** **A1** **[3]**	**1.1** **1.1** **2.2a**	E E C	Resolving horizontally and vertically Pythagoras on two forces – both must include 41.4 3.4 or better	**Alt** – M1 for cosine rule with their P, 3 and 41.4, A1 for 11.4966… or 11.5 3.3911649…

Question			Answer	Marks	AO		Guidance	
10	(iii)	(b)	$\tan\alpha = \dfrac{P - 3\cos\theta}{3\sin\theta}$	**M1**	**3.1a**	E	Where α is the angle below the horizontal	**Alt** – M1 for $\dfrac{\sin\alpha}{3} = \dfrac{\sin 41.4}{'3.39'}$
			54.2^{o} below the horizontal	**A1**	**3.2a**	A	54.2 or better – must indicate 'below horizontal' or equivalent to the 'downward vertical' (35.8) – direction may be shown on diagram with minimum of arrow on resultant or arrows on both components	54.18696…
				[2]				