

Exercise 10 B

$$(5) \quad \underline{R} = \begin{pmatrix} R_x \\ R_y \end{pmatrix} = \begin{pmatrix} 10 \cos 40^\circ \\ 10 \sin 40^\circ \end{pmatrix} + \begin{pmatrix} -6 \cos 80^\circ \\ -6 \sin 80^\circ \end{pmatrix} + \begin{pmatrix} -4 \cos 30^\circ \\ 4 \sin 30^\circ \end{pmatrix}$$

$$\therefore \underline{R} = \begin{pmatrix} R_x \\ R_y \end{pmatrix} = \begin{pmatrix} 7,660 \\ 6,428 \end{pmatrix} + \begin{pmatrix} -1,042 \\ -5,909 \end{pmatrix} + \begin{pmatrix} -3,464 \\ 2,0 \end{pmatrix}$$

$$\therefore \underline{R} = \begin{pmatrix} R_x \\ R_y \end{pmatrix} = \begin{pmatrix} 3,154 \\ 2,519 \end{pmatrix}$$

$$\therefore R = \sqrt{R_x^2 + R_y^2} = 4,04 \text{ N}$$

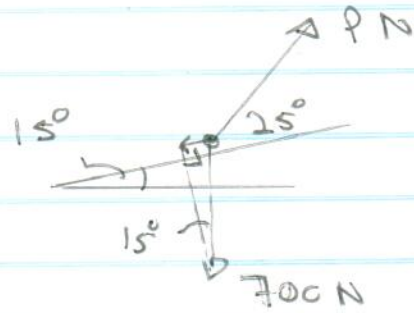
$$\therefore \theta = \tan^{-1} \left(\frac{2,519}{3,154} \right) = 38,6^\circ$$



Anti-clockwise from x-axis

Exercise 10C

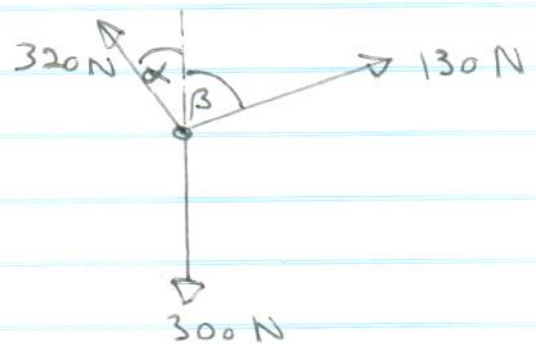
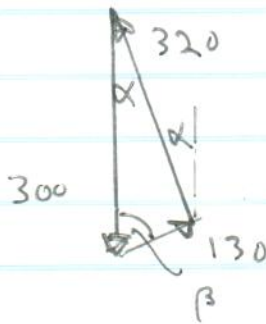
(4) $\rightarrow \sum F_x = 0$
(constant speed $\Rightarrow a = 0$)



$$P \cos 25^\circ - 700 \sin 15^\circ = 0$$

$$\therefore P = 200 \text{ N}$$

(8)



$$320^2 = 300^2 + 130^2 - 2(300)(130) \cos \beta$$

$$\therefore \beta = 86,7^\circ$$

$$\frac{\sin \alpha}{130} = \frac{\sin \beta}{320} = \frac{\sin 86,7^\circ}{320}$$

$$\therefore \alpha = 23,9^\circ$$

Miscellaneous Ex 10

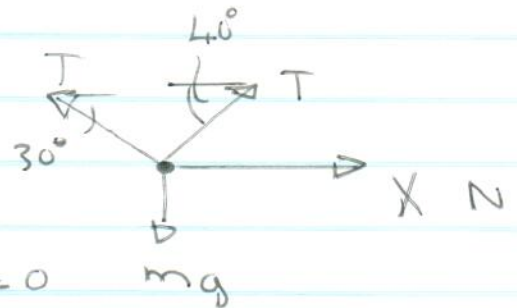
$$(1) R_x = 5 + 7 \cos 55^\circ = 9,015 \text{ N}$$

$$R_y = 7 \sin 55^\circ = 5,734 \text{ N}$$

$$\therefore R = \sqrt{R_x^2 + R_y^2} = 10,7 \text{ N}$$

$$\theta = \tan^{-1} \left(\frac{5,734}{9,015} \right) = 32,5^\circ$$

(2)



$$\uparrow \Sigma F_y = 0$$

$$\therefore -0,3(10) + T \sin 30^\circ + T \sin 40^\circ = 0$$

$$\therefore T = 2,63 \text{ N}$$

$$\rightarrow \Sigma F_x = 0: -T \cos 30^\circ + T \cos 40^\circ + X = 0$$

$$\therefore X = 0,262 \text{ N}$$