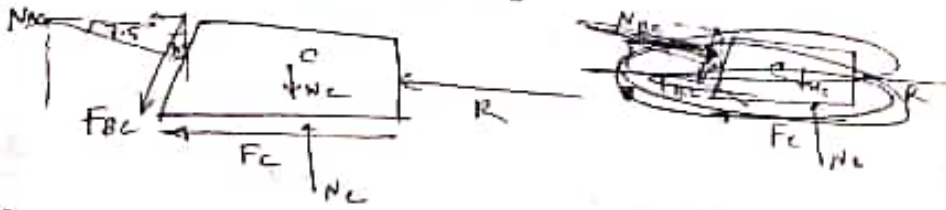


Friction

929 $f = \frac{1}{3}$, $R = 8000 \text{ lb}$, $W_c = 5000 \text{ lb}$



$$\sum F_x = 0$$

$$\Rightarrow N_{bc} \cos 7.5^\circ - F_{bc} \sin 7.5^\circ - R - F_c = 0$$

$$\Rightarrow F_c = 0.99 N_{bc} - 8000 - 0.13 F_{bc}$$

$$\Rightarrow \frac{1}{3} N_c = 0.99 N_{bc} - 8000 - 0.13 \times \frac{1}{3} N_c$$

$$\Rightarrow N_c = 2.84 N_{bc} - 24000 \quad \text{--- (1)}$$

$$\sum F_y = 0$$

$$\Rightarrow N_c = N_{bc} \sin 7.5^\circ - F_{bc} \cos 7.5^\circ - W_c = 0$$

$$\Rightarrow N_c = 0.46 N_{bc} + 5000 \quad \text{--- (2)}$$

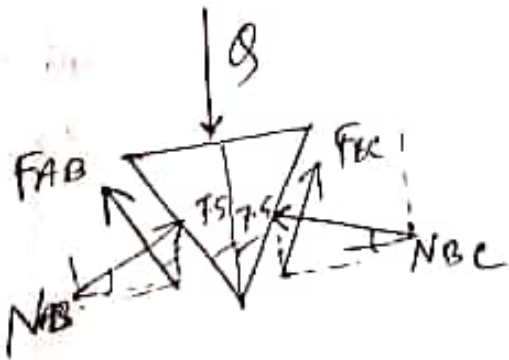
Solving (1) and (2) we have,

$$N_{bc} = 12184.8712$$

$$N_c = 10605 \text{ lb}$$

$$F_{bc} = 4061.6213$$

$$F_c = 3535 \text{ lb}$$



$$\sum F_x = 0$$

$$N_{bc} \cos 7.5^\circ - F_{bc} \sin 7.5^\circ - N_{bc} \cos 7.5^\circ + F_{bc} \sin 7.5^\circ = 0$$

$$\Rightarrow N_{AB} \cos 7.5 - \frac{1}{3} N_{AB} \sin 7.5 + \frac{1}{3} N_{BC} \sin 7.5 - N_{BC} \cos 7.5 = 0$$

$$\Rightarrow N_{AB} = N_{BC} \quad \therefore F_{AB} = F_{BC}$$

$$\sum F_y = 0$$

$$\Rightarrow N_{AB} \sin 7.5 + F_{BC} \cos 7.5 + F_{BC} \cos 7.5 + N_{BC} \sin 7.5 = 8$$

$$\Rightarrow 8 = 11187.67 \text{ lb} \quad \text{Ans}$$

$F_{BC} = N_{BC}$
($f = N$)

430 $W_A = W_B = W_C = 500 \text{ lb}$

$$f_s = \frac{1}{4}$$



$$\sum F_y = 0$$

$$\Rightarrow F_{AB} \sin 10^\circ + W_A - N_{AB} \cos 10^\circ = 0$$

$$\Rightarrow \frac{1}{4} N_{AB} \sin 10^\circ + 500 - N_{AB} \cos 10^\circ = 0$$

$$\Rightarrow 500 + N_{AB} \left(\frac{1}{4} \sin 10^\circ - \cos 10^\circ \right) = 0$$

$$\Rightarrow N_{AB} = 531.126 \text{ lb}$$

$$\sum F_x = 0$$

$$\Rightarrow T_A - F_{AB} \cos 10^\circ - N_{AB} \sin 10^\circ = 0$$

$$\Rightarrow T_A - \frac{1}{4} N_{AB} \cos 10^\circ - N_{AB} \sin 10^\circ = 0$$

$$\Rightarrow T_A = 223 \text{ lb} \quad \text{Ans}$$

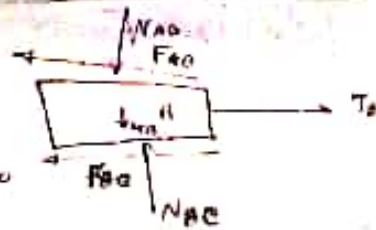
FIGURE NO.

$$\sum F_y = 0$$

$$\Rightarrow N_{BC} - 500 - N_{AB} \cos 10^\circ + F_{AB} \sin 10^\circ = 0$$

$$\Rightarrow N_{BC} = 1000 \text{ lb}$$

$$\therefore F_{BC} = 250 \text{ lb}$$

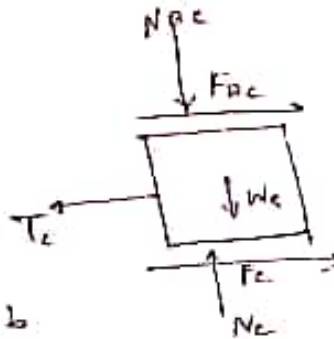


$$\sum F_y = 0$$

$$\Rightarrow N_C - W_C - N_{BC} = 0$$

$$\Rightarrow N_C = 500 + 1000 = 1500 \text{ lb}$$

$$\therefore F_C = 375 \text{ lb}$$



$$\sum F_x = 0$$

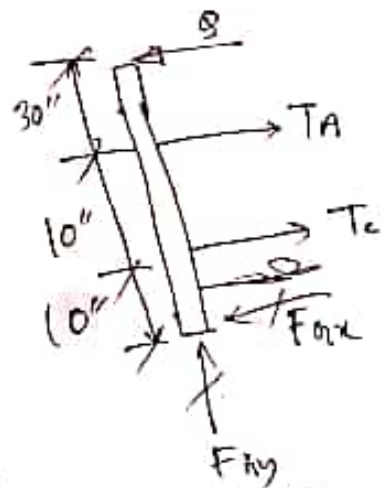
$$\Rightarrow T_C - F_{BC} - F_C = 0$$

$$\Rightarrow T_C = 250 + 375 = 625 \text{ lb}$$

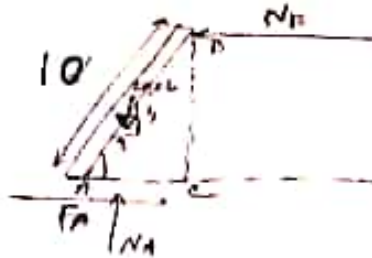
$$\sum M_A = 0$$

$$\Rightarrow 8 \times 90 - T_A \times 20 - T_C \times 10 = 0$$

$$\Rightarrow 8 = 214.2 \text{ lb} \quad \text{Answer}$$



444



$\tan \theta = \frac{4}{3}$
 $\theta = 53.13^\circ$

$AC = 10 \cos \theta = 6'$
 $BC = 8'$

$\sum M_B = 0$

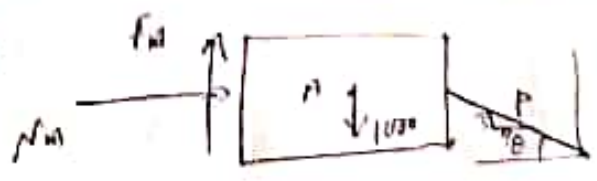
$\Rightarrow N_A \times 6 - 20 \times 3 - F_A \times 8 = 0$

$\Rightarrow 6N_A - 60 - 0.5 \times 8N_A = 0$

$\Rightarrow N_A = 30 \text{ lb}$

$F_A = \mu N_A = 0.5 \times 30 = 15 \text{ lb}$

454 For which value of P the block will be slip or tip?
 $\mu = 0.2$
 (i) $P = 1508.12$



$\theta = \tan^{-1} \frac{3}{4}$
 $= 36.87^\circ$

$\sum F_x = 0$

$\Rightarrow N_A - \cos 36.87^\circ = 0$ (i)

$\sum F_y = 0$

$\Rightarrow F_A + P \sin 36.87^\circ - 1000 = 0$ (ii)

$\Rightarrow 0.2N_A + P \sin 36.87^\circ - 1000 = 0$ (iii)

FIGURE NO.

$$N_A = 1042.61 \text{ lb}$$

$$P = 1315.79 \text{ lb}$$

Since $1000 < 1315.79 \text{ lb}$ then, it will be slip (not in equilibrium)

and $1500 > 1315.79 \text{ lb}$ then, it will be slip (not in equilibrium)

460 If block A is sliding

$$\sum F_y = 0$$

$$\Rightarrow W_A - N_A = 0$$

$$\Rightarrow N_A = 40 \text{ lb}$$

$$\sum F_x = 0$$

$$\Rightarrow P - F_A = 0$$

$$\Rightarrow P - 0.40 N_A = 0$$

$$\Rightarrow P = 0.40 \times 40 = 16 \text{ lb}$$

If block A is tip over

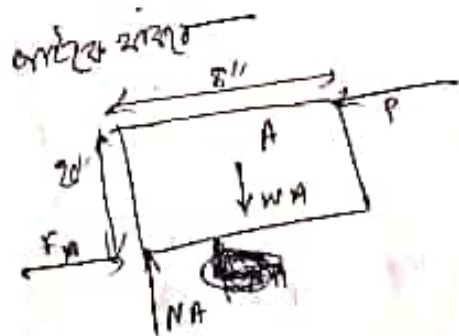
$$\sum M_A = 0$$

$$\Rightarrow P \times 20 - W_A \times 4 = 0$$

$$\Rightarrow P = 8 \text{ lb}$$



$$W_A = 40 \text{ lb}$$



If block A and B is sliding

$$\sum F_y = 0$$

$$\Rightarrow N_B - W_A - W_B = 0$$

$$\Rightarrow N_B = 40 + 50 = 90 \text{ lb}$$

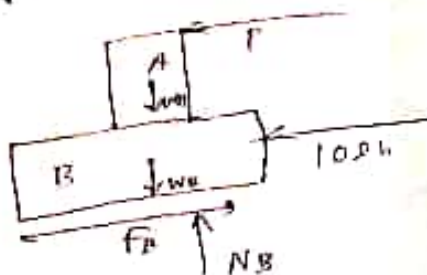
$$\sum F_x = 0$$

$$\Rightarrow F_B - P - 10 = 0$$

$$\Rightarrow 0.30 N_B - P - 10 = 0$$

$$\Rightarrow 0.30 \times 90 - P - 10 = 0$$

$$\Rightarrow P = 17 \text{ lb}$$



$$F_y = 0$$

$$N_B = 1000$$

$$= 4$$

$$\therefore F_B =$$

2

$$= \tan^{-1}$$

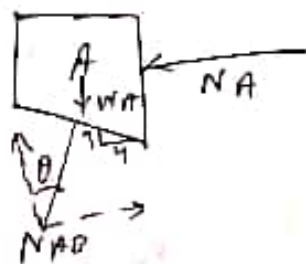
$$= 36.87^\circ$$

Since force $P = 8 \text{ lb}$ is small, the body will tip over.

$$\sum F_y$$

461

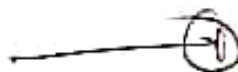
$$W_A = 3600 \text{ lb}$$



$$\theta = \tan^{-1} \frac{3}{4} = 36.87^\circ$$

$$\sum F_x = 0$$

$$\Rightarrow N_A - N_{AB} \sin 36.87^\circ = 0$$



~~$$\Rightarrow N_A =$$~~

$$\sum F_y = 0$$

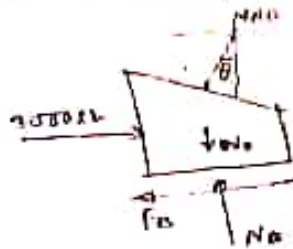
$$\Rightarrow W_A - N_{AB} \cos 36.87^\circ = 0$$

$$\Rightarrow N_{AB} = 4500 \text{ lb}$$

FIGURE NO.

$$\sum F_y = 0$$

$$N_A = 1000 + N_{AB} \cos 36.87^\circ = 4600 \text{ lb}$$

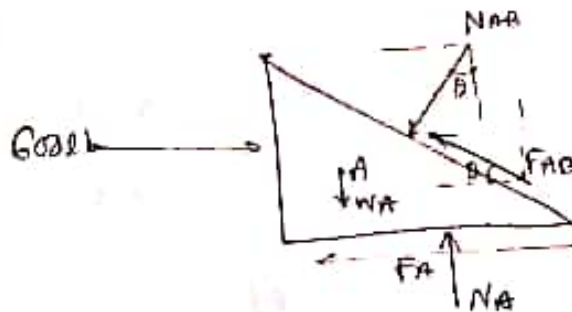


$$F_R = \mu N_A = 0.7 \times 4600 = 460 \text{ lb} \text{ Ans.}$$

762

$$\theta = \tan^{-1} \frac{3}{4} = 36.87^\circ$$

$$\sum F_y = 0$$



$$\Rightarrow N_A + F_{AB} \sin \theta - W_A - N_{AB} \cos \theta = 0$$

$$\Rightarrow N_A + 0.5 N_{AB} \sin 36.87^\circ - 500 - N_{AB} \cos 36.87^\circ = 0$$

$$\Rightarrow N_A + N_{AB} (0.5 \sin 36.87^\circ - \cos 36.87^\circ) - 500 = 0 \quad \text{--- (1)}$$

$$\sum F_x = 0$$

$$\Rightarrow 600 - F_A - N_{AB} \sin \theta - F_{AB} \cos \theta = 0$$

$$\Rightarrow 0.5 N_A + N_{AB} (\sin 36.87^\circ + 0.5 \cos 36.87^\circ) - 600 = 0 \quad \text{--- (2)}$$

Solving (1) and (2)

$$N_A = 639.99 \text{ lb}$$

$$N_{AB} = 280 \text{ lb}$$

$$\therefore F_{AB} = 0.5 N_{AB} = 140 \text{ lb}$$

$$\sum F_x = 0$$

$$\Rightarrow F_{AB} \cos \theta + N_{AB} \sin \theta - N_B = 0$$

$$\Rightarrow N_B = 280 \text{ lb}$$

$$\therefore F_B = 280 \times 0.4 = 112 \text{ lb}$$



$$\sum F_y = 0$$

$$\Rightarrow W_B + F_B + F_{AB} \sin \theta - 100 - N_{AB} \cos \theta = 0$$

$$\Rightarrow W_B + 112 + 140 \sin 36.87^\circ - 100 - 280 \cos 36.87^\circ = 0$$

$$\Rightarrow W_B = 127.99 \text{ lb} \quad \underline{\text{Ans}}$$

FIGURE NO.

$$\sum F_x = 0$$

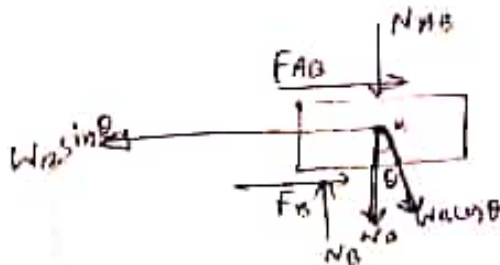
$$\Rightarrow T - W \sin \theta - F_{AB} = 0$$

$$\Rightarrow T = W \sin \theta + F_{AB}$$

$$= 50 \sin \theta + 0.25 N_{AB}$$

$$= 50 \sin \theta + 0.25 \times 50 \cos \theta$$

$$\Rightarrow T = 50 \sin \theta + 12.5 \cos \theta \quad \text{--- (i)}$$



$$\sum F_y = 0$$

$$N_B - N_{AB} + W_B \cos \theta = 0$$

$$\Rightarrow N_B = N_{AB} + 100 \cos \theta \quad \text{--- (ii)}$$

$$\sum F_x = 0$$

$$F_{AB} + F_D - W_B \sin \theta = 0$$

$$\Rightarrow 0.25 N_{AB} + 0.25 N_B - 100 \sin \theta = 0 \quad \text{--- (iii)}$$

At the value of N_B in (ii) we have

$$0.25 N_{AB} + 0.25 (N_{AC} + 100 \cos \theta) - 100 \sin \theta = 0$$

$$\Rightarrow 0.25 \times 500 \cos \theta + 0.25 (50 \cos \theta + 100 \cos \theta) - 100 \sin \theta = 0$$

$$\Rightarrow 50 \cos \theta = 100 \sin \theta$$

$$\Rightarrow \tan \theta = \frac{1}{2}$$

$$\therefore \theta = 26.57^\circ \quad \text{Ans}$$

$$\therefore T = 50 \sin \theta + 12.5 \cos \theta$$

$$= 50 \sin 26.57^\circ + 12.5 \cos 26.57^\circ$$

$$= 33.54 \text{ lb} \quad \text{Ans}$$

470 When $P > Q$

$$\therefore P = Q e^{\mu \theta}$$

$$\Rightarrow 500 = Q e^{0.4 \times \pi}$$

$$\Rightarrow Q = 142.5 \text{ lb}$$

When $P < Q$:

$$Q = 500 e^{0.4 \times \pi}$$

$$= 1756.7 \text{ lb}$$

The range of the value of Q

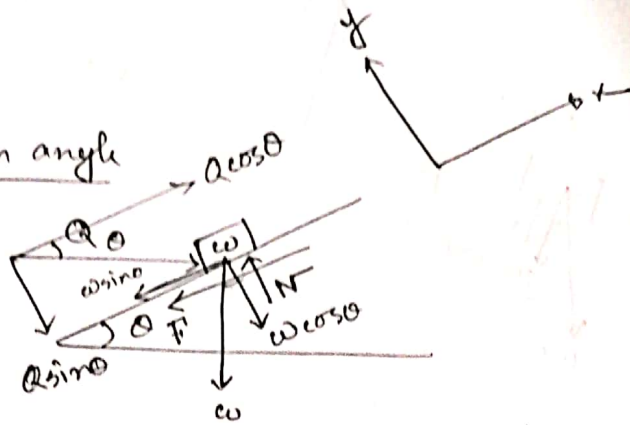
142.5 to 1756.7 lb

Ans



Math

For minimum angle



$$\sum F_y = 0$$

$$N - W \cos \theta - Q \sin \theta = 0$$

$$N = 100 \cos \theta + 100 \sin \theta \quad \text{--- (1)}$$

$$\sum F_x = 0$$

$$0.4N + W \sin \theta - Q \cos \theta = 0$$

$$\Rightarrow 0.4(100 \cos \theta + 100 \sin \theta) + 100 \sin \theta - 100 \cos \theta = 0$$

$$\Rightarrow 100 \cos \theta - 100 \sin \theta - 40 \cos \theta - 40 \sin \theta = 0$$

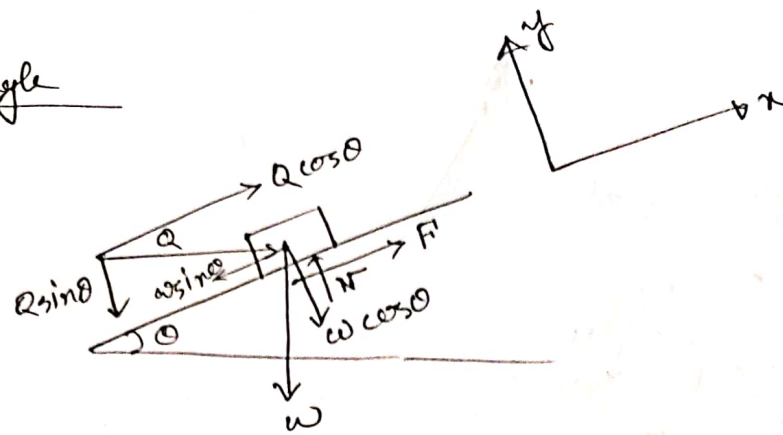
$$\Rightarrow 60 \cos \theta - 140 \sin \theta = 0$$

$$\Rightarrow 60 \cos \theta = 140 \sin \theta$$

$$\Rightarrow \tan \theta = \frac{60}{140}$$

$$\theta = 23.2^\circ$$

Force largest angle



$$\sum F_y = 0$$

$$W \cos \theta + Q \sin \theta = N$$

$$\sum F_x = 0$$

$$Q \cos \theta + 0.4N - W \sin \theta = 0$$

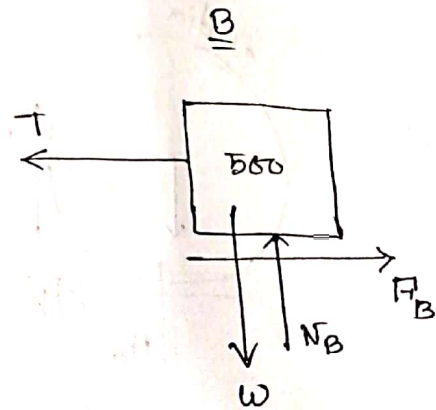
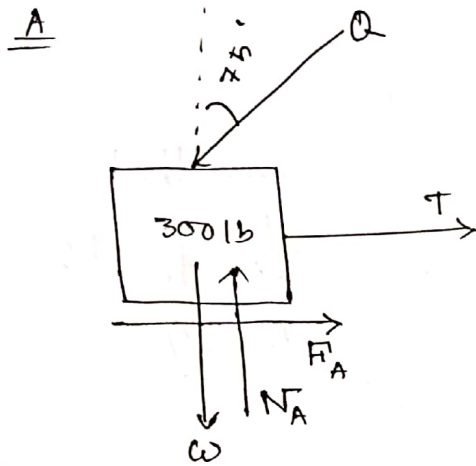
$$0.4(100 \cos \theta + 100 \sin \theta) + 100 \cos \theta - 100 \sin \theta = 0$$

$$\Rightarrow 40 \cos \theta + 40 \sin \theta + 100 \cos \theta - 100 \sin \theta = 0$$

$$\Rightarrow 140 \cos \theta - 60 \sin \theta = 0$$

$$\Rightarrow \frac{\sin \theta}{\cos \theta} = \frac{140}{60}$$

$$\Rightarrow \theta = 26.8^\circ \text{ Ans}$$



For B,

$$W = N_B$$

$$N_B = 500$$

$$\begin{aligned} T &= F_B \\ &= \frac{1}{3} \times 500 \\ &= 166.67 \text{ lb} \end{aligned}$$

For A,

$$\sum F_x = 0$$

$$Q \sin 75^\circ - N_A \times f_A - T = 0$$

$$(Q \sin 75^\circ - 166.67) \times 3 = N_A \quad \text{--- (1)}$$

$$\sum F_y = 0$$

$$Q \cos 75^\circ - N_A + W = 0$$

$$N_A = Q \cos 75^\circ + 300 \quad \text{--- (2)}$$

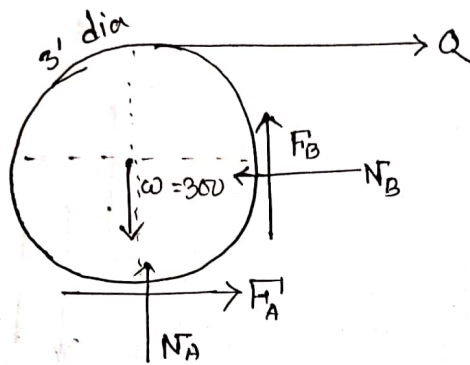
$$3Q \sin 75^\circ - 500 = Q \cos 75^\circ + 300$$

$$\Rightarrow 3Q \sin 75^\circ - Q \cos 75^\circ = 800$$

$$\Rightarrow Q = 303 \text{ lb } \underline{\text{Ans.}}$$

Math

Flon Spinning



Given that

$$f_A = f_B = 1/3 ; \omega = 300 \text{ lb}$$

$$Q = ?$$

$$\sum F'_y = 0$$

$$N_A + F'_B = 300$$

$$N_A + \frac{1}{3} N_B = 300 \quad \text{--- (I)}$$

$$\sum F'_x = 0$$

$$Q + \frac{1}{3} N_A - N_B = 0 \quad \text{--- (II)}$$

$$\sum M_A = 0$$

$$Q \times 3 - N_B \times 1.5 - F'_B \times 1.5 = 0$$

$$\Rightarrow 3Q - 2N_B = 0 \quad \text{--- (III)}$$

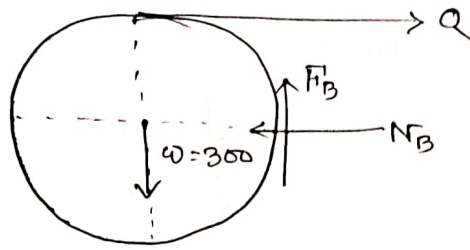
$$N_A = 225$$

$$N_B = 225$$

$$Q = 150$$

Ans.

Rolling



$$\sum F_x = 0$$

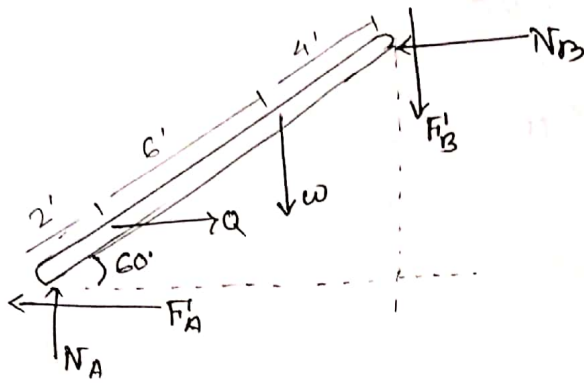
$$Q - N_B = 0$$

$$\sum F_y = 0$$

$$\omega - \frac{1}{3} N_B = 0$$

$$N_B = 900$$

$$Q = 900 \text{ lb } \underline{\text{Ans.}}$$



$$\begin{aligned} W &= 500 \\ f_A &= 0.2 \\ f_B &= 0.3 \\ Q &=? \end{aligned}$$

$$\sum F_x = 0$$

$$Q - N_B - F_A = 0$$

$$\Rightarrow Q - N_B - 0.2N_A = 0 \quad \text{--- (1)}$$

$$\sum F_y = 0$$

$$500 + F_B - N_A = 0$$

$$\Rightarrow 0.3N_B + 500 = N_A = -500 \quad \text{--- (1)}$$

$$\sum M_A = 0$$

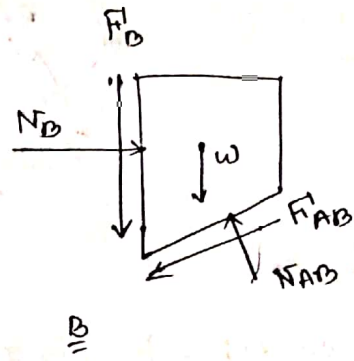
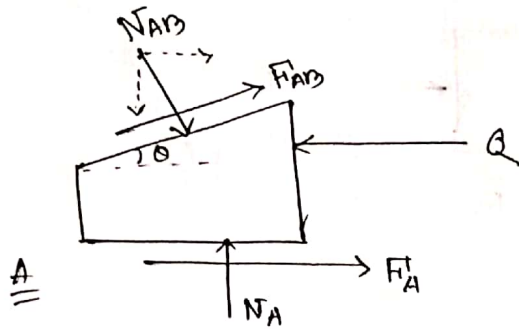
$$Q \times 2 \times \sin 60^\circ + W \times 8 \cos 60^\circ + F_B \times 12 \cos 60^\circ - N_B \times 12 \sin 60^\circ = 0$$

$$\Rightarrow Q \times 2 \sin 60^\circ + N_B \times (3.6 \cos 60^\circ - 12 \sin 60^\circ) = -2500 \quad \text{--- (1)}$$

solving equation

$$\therefore Q = 440.95 \text{ lb } \underline{\text{Ans.}}$$

4271

For A

$$\sum F_y = 0$$

$$N_A + F_{AB} \sin 15^\circ - N_{AB} \cos 15^\circ = 0$$

$$\Rightarrow N_A + 0.086 N_{AB} - 0.96 N_{AB} = 0$$

$$\Rightarrow N_A = 0.88 N_{AB} \quad \text{--- (1)}$$

$$\sum F_x = 0$$

$$F_A - 2000 + N_{AB} \sin 15^\circ + F_{AB} \cos 15^\circ = 0$$

$$\Rightarrow \frac{1}{3} N_A - 2000 + 0.258 N_{AB} + 0.32 N_{AB} = 0$$

$$\Rightarrow \frac{1}{3} N_A + 0.578 N_{AB} = 2000 \quad \text{--- (2)}$$

$$N_A = 2020 \text{ lb}$$

$$N_{AB} = 2295 \text{ lb}$$

$$\therefore F_{AB} = 765 \text{ lb}$$

$$\therefore F_A = 673.33 \text{ lb}$$

For B

$$\sum F_x = 0$$

$$N_B - N_{AB} \sin 15^\circ - F_{AB} \cos 15^\circ = 0$$

$$\Rightarrow N_B - 0.258 N_{AB} - 0.32 N_{AB} = 0$$

$$\Rightarrow N_B - 0.578 N_{AB} = 0$$

$$\Rightarrow N_B = 1326 \text{ lb}$$

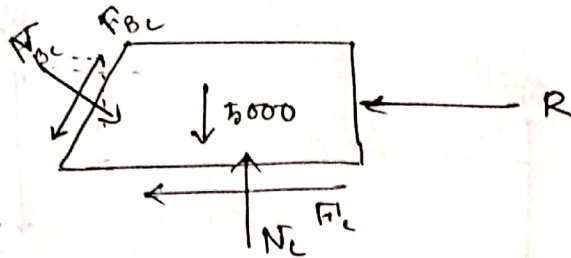
$$\rightarrow F_B = 442 \text{ lb}$$

$$\sum F_y = 0$$

$$F_B + W - N_{AB} \cos 15^\circ + F_{AB} \sin 15^\circ = 0$$

$$442 + W + 198 - 2216.7 = 0$$

$$W = 1576 \text{ lb} \quad \underline{\text{Ans.}}$$



$$\sum F_x = 0$$

$$N_{BC} \cos 7.5 - F_{BC} \sin 7.5 - F_C - R = 0$$

$$\Rightarrow N_{BC} \cos 7.5 - N_{BC} \frac{\sin 7.5}{3} - \frac{1}{3} N_C - 8000 = 0$$

$$\Rightarrow 2.85 N_{BC} - N_C = 24000 \quad \text{--- (1)}$$

$$\sum F_y = 0$$

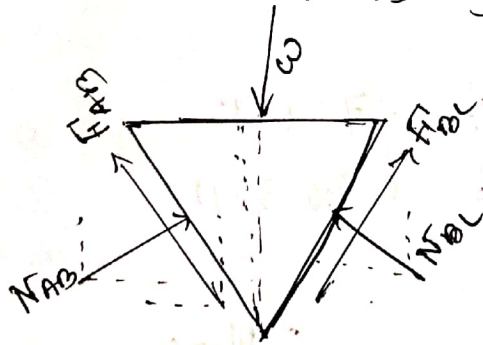
$$5000 - N_C + F_{BC} \cos 7.5 + N_{BC} \sin 7.5 = 0$$

$$\Rightarrow 0.46 N_{BC} - N_C = -5000 \quad \text{--- (2)}$$

$$\therefore N_{BC} = 12133.89 \text{ lb}$$

$$N_C = 10581.58 \text{ lb}$$

$$\left. \begin{array}{l} N_{BC} = 12133.89 \text{ lb} \\ N_C = 10581.58 \text{ lb} \end{array} \right\} F_{BC} = 4044.63 \text{ lb}$$



$$\sum F_x = 0$$

$$N_{AB} \cos 7.5 - F_{AB} \sin 7.5 - N_{BC} \cos 7.5 + F_{BC} \sin 7.5 = 0$$

$$\Rightarrow N_{AB} \cos 7.5 - N_{AB} \frac{\sin 7.5}{3} - 12133.89 \cos 7.5 + 4044.6$$

$$\Rightarrow N_{AB} = 12133.89 \text{ lb}$$

$$\therefore F_{AB} = 4044.63 \text{ lb}$$

$$\therefore Q = F_{Bc} \cos 7.5^\circ \times 2 + N_{Bc} \sin 7.5^\circ \times 2$$

$$\therefore Q = 111.87.86 \text{ lb } \underline{\text{Ans.}}$$

460

If block A is sliding

$$\sum F_y = 0$$

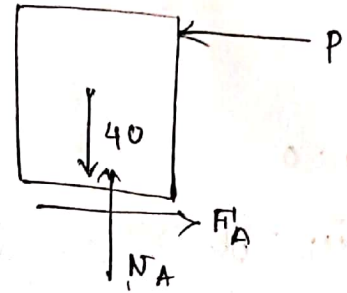
$$N_A - 40 = 0$$

$$\therefore N_A = 40 \text{ lb}$$

$$\sum F_x = 0$$

$$F_A = P$$

$$P = 40 \times 0.4 = 16 \text{ lb } \underline{\text{Ans.}}$$

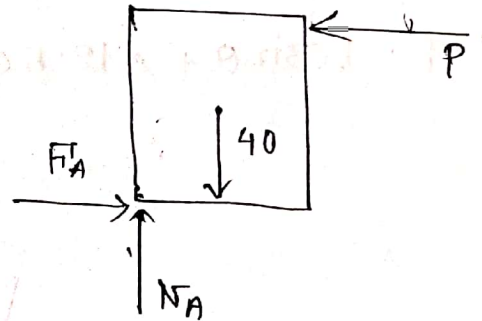


If block A is tip over

$$\sum M_A = 0$$

$$-P \times 20 + 40 \times 4 = 0$$

$$P = 8 \text{ lb } \underline{\text{Ans.}}$$



If both A and B is sliding

$$\sum F_y = 0$$

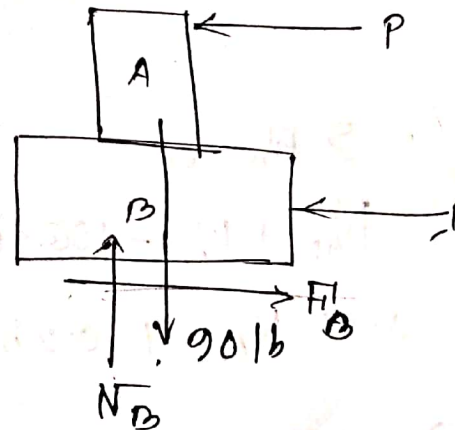
$$N_B = 90$$

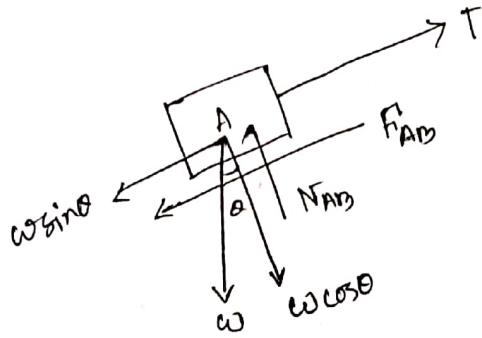
$$\therefore F_B = 90 \times 0.3 = 27 \text{ lb}$$

$$\sum F_x$$

$$\therefore P = (27 - 10) \text{ lb}$$

$$= 17 \text{ lb } \underline{\text{Ans.}}$$





$$\sum F_y = 0$$

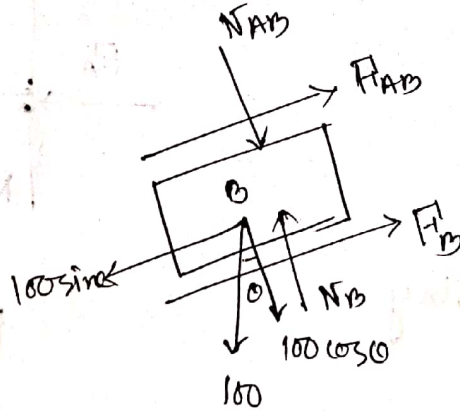
$$N_{AB} = 50 \cos \theta \quad \text{--- (i)}$$

$$\sum F_x = 0$$

$$T - 50 \sin \theta - F_{BA} = 0$$

$$\Rightarrow T = 50 \sin \theta + 0.25 \times N_{AB} \quad \text{--- (ii)}$$

$$\therefore T = 50 \sin \theta + 12.5 \cos \theta$$



$$\sum F_y = 0$$

$$N_B = N_{AB} + 100 \cos \theta$$

$$\sum F_x = 0$$

$$F_{AB} + F_B - 100 \sin \theta = 0$$

$$0.25 N_{AB} + 0.25 N_B - 100 \sin \theta = 0$$

$$\Rightarrow 0.25 \times 50 \cos \theta + 0.25 (50 \cos \theta + 100 \cos \theta) - 100 \sin \theta = 0$$

$$\Rightarrow 12.5 \cos \theta + 12.5 \cos \theta + 25 \cos \theta - 100 \sin \theta = 0$$

$$\Rightarrow 50 \cos \theta = 100 \sin \theta$$

$$\therefore \theta = 26.57^\circ \text{ App.}$$

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Case - 01

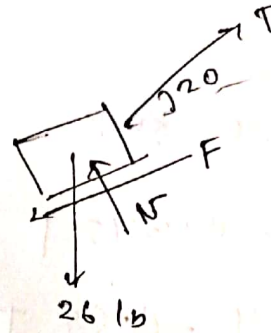
If the block move uppers.

$$\sum F_y = 0$$

$$N + T \sin 20^\circ - 26 \cos 40^\circ = 0$$

$$\Rightarrow N = 19.92 - 0.342T$$

$$\Rightarrow F' = 3.984 - 0.068T$$



$$\sum F_x = 0$$

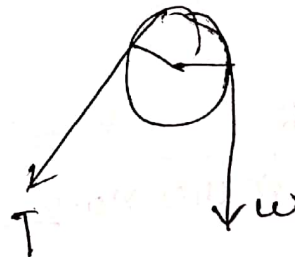
$$T \cos 20^\circ - F' - 26 \sin 40^\circ = 0$$

$$\Rightarrow T \cos 20^\circ - 3.984 + 0.068T - 26 \sin 40^\circ = 0$$

$$\Rightarrow T = 20.53 \text{ lb}$$

$$W = 20.53 \text{ lb} \left(\frac{\pi}{180} \times 150 \times 0.2 \right)$$

$$\Rightarrow 34.66 \text{ lb } \underline{\text{Ans.}}$$



If the block moves down

$$\sum F_y = 0$$

$$N + T \sin 20^\circ - 26 \cos 40^\circ$$

$$\Rightarrow N = 19.92 - 0.342 T$$

$$\Rightarrow F = 3.984 - 0.6068 T$$

$$\sum F_x = 0$$

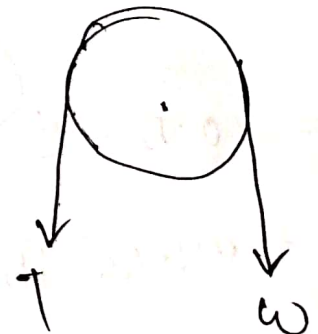
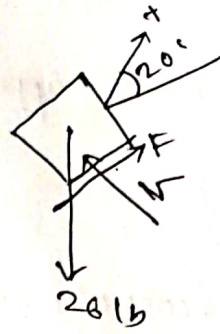
$$F + T \cos 20^\circ - 26 \sin 40^\circ = 0$$

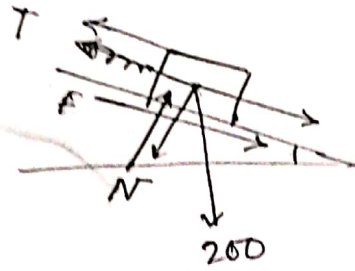
$$T = 14.6 \text{ lb}$$

$$T = \omega r f \theta$$

$$\omega = \frac{14.6}{\frac{\pi}{180} \times 150 \times 0.2}$$

$$= 8.65 \text{ lb } \underline{\text{Ans.}}$$





Case-01 sliding

$$\sum F_y = 0$$

$$\Rightarrow N - 200 \cos 30^\circ = 0$$

$$\Rightarrow N = 173.21 \text{ lb}$$

$$\begin{aligned} \Rightarrow F &= 0.5 \times 173.21 \\ &= 86.61 \end{aligned}$$

$$\sum F_x =$$

$$F + 200 \sin 30^\circ - T = 0$$

$$T = 186.81 \text{ lb}$$

$$T' = T e^{f\theta}$$

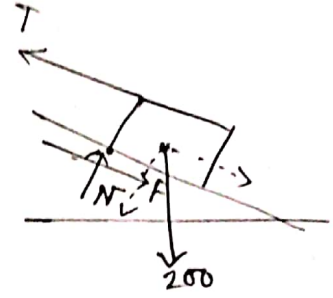
$$\begin{aligned} &= 186.81 e \\ &= 158.25 \times e^{\left(\frac{\pi}{6} \times \frac{2}{\pi}\right)} \end{aligned}$$

$$= 220.86 \text{ lb}$$

$$T'' = T' e^{f\theta}$$

$$= 220.86 e^{\left(\frac{\pi}{2} \times \frac{4}{3} \pi\right)}$$

$$= 159101.26 \text{ lb } \underline{\underline{\text{Ans.}}}$$



Case-02

tip over,

$$\sum M_A = 0$$

$$200 \cos 30^\circ \times \frac{2.5}{2} + 200 \sin 30^\circ \times$$

$$- T \times 2 = 0$$

$$T = 158.25 \text{ lb}$$

