

Written Quiz # 8

Name: Key

ID#: _____

Note: Rewrite the solution of your homework clearly, neatly, and completely.

The principles of a differential chain block are indicated schematically in the figure. Determine the magnitude of force **P** needed to support the 800-N force. Also, find the distance **x** where the cable must be attached to bar **AB** so the bar remains horizontal. All pulleys have a radius of 60 mm.

Given:

The forces shown in Fig.

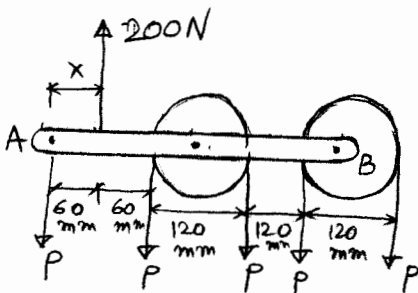
Req.d:

The magnitude of force "P",
The distance "x" for which the bar AB remains horizontal.

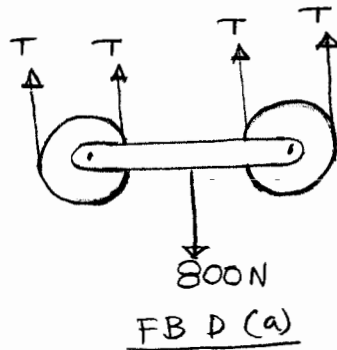
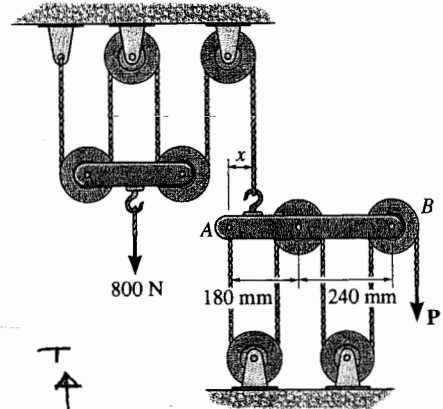
Sol.n:

From FBD (a)

$$\begin{aligned} \sum F_y &= 0 \\ \Rightarrow 4T &= 800 \\ \Rightarrow T &= 200 \text{ N} \end{aligned}$$



FBD (b)



From FBD (b)

$$\sum F_y = 0 \Rightarrow 5P = 200 \therefore \boxed{P = 40 \text{ N}}$$

For maintaining AB Bar horizontal, $\sum M_A = 0$

$$\therefore 200 \times x - 40 \times 120 - 40 \times 240 - 40 \times 360 - 40 \times 480 = 0$$

$$\Rightarrow \boxed{x = 240 \text{ mm}}$$