Conceptual Question C8.1

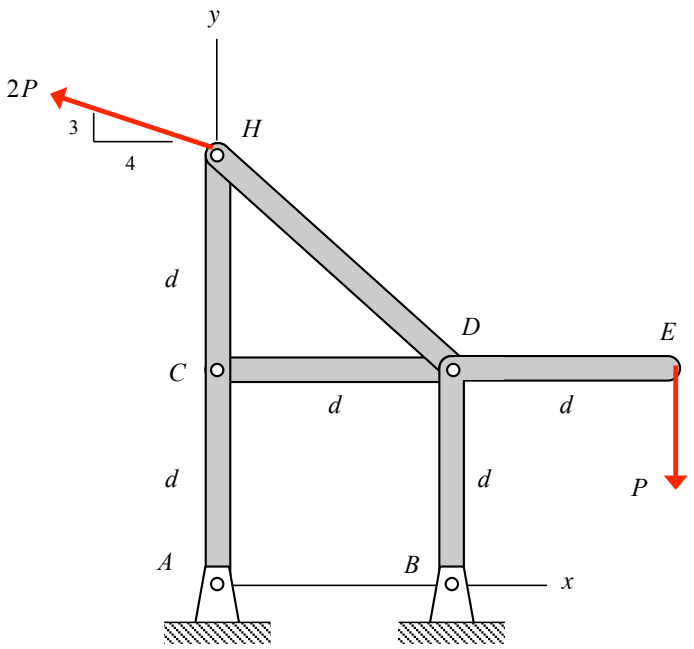
Given: A frame is made up of four members: AH, HD, CD and BDE. Loads of P and 2P are applied at locations H and E, respectively, on the frame. Let the reaction force on the frame at A be represented by $\vec{A} = A_x\hat{i} + A_y\hat{j}$.

Find:

Circle the correct response below regarding the direction of the y-component of the reaction force on the frame at A:

- $A_y > 0$
- $A_y = 0$
- $A_y < 0$

Provide an explanation for your answer.



Conceptual Question C8.2

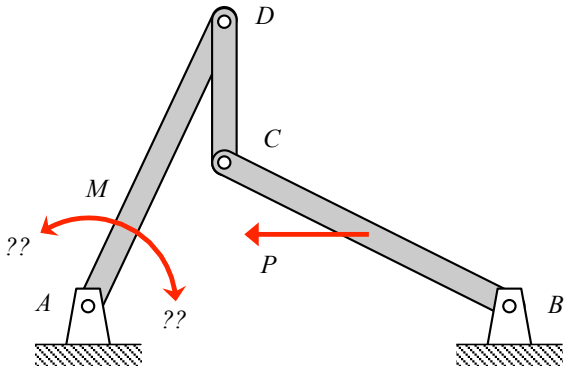
Given: A mechanism is made up of members AD, DC and CB. With a load of P being applied to member BC, a couple $\vec{M}$ is applied to member AD is needed to keep the mechanism in equilibrium.

Find:

Circle the correct response below regarding the direction of the couple $\vec{M}$ to be applied to member AD:

- $\vec{M}$ is counter-clockwise
- $\vec{M} = \vec{0}$
- $\vec{M}$ is clockwise

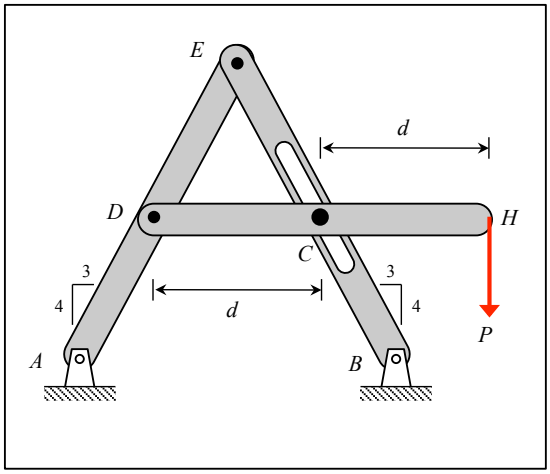
Provide an explanation for your answer.



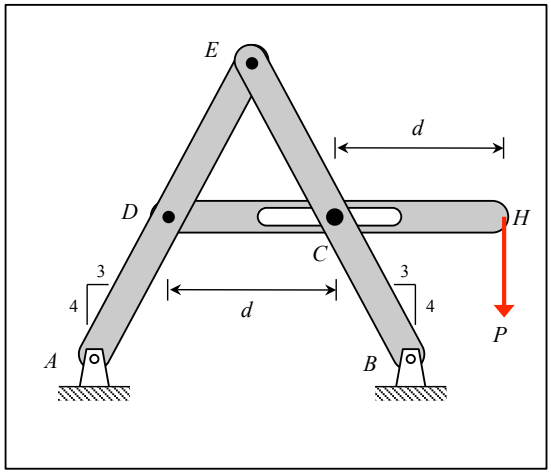
Conceptual Question C8.3

Given: Consider Frame 1 shown below, with a smooth sliding joint between members DH and BE at C. In this frame, the slot for the sliding joint is in member BE and aligned with the line BE. Frame 2, also shown below, is identical to Frame 1, except the slot for the sliding joint at C is in member DH and aligned with the line DH.

Find: Compare the magnitude of the contact force of pin C on the slot for the sliding joints of the two frames. Which one is larger? Can you explain why?



Frame 1



Frame 2

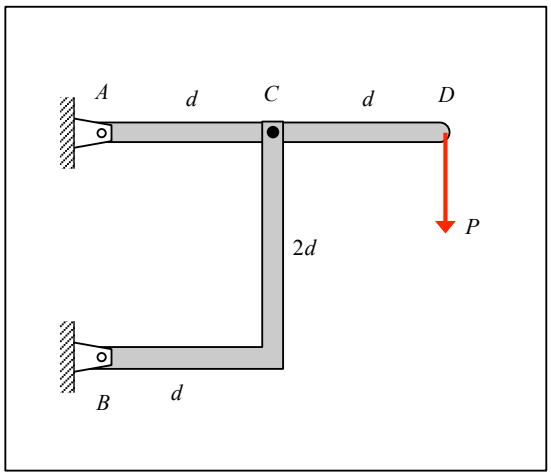
Conceptual Question C8.4

Given: Consider Frame 1 shown below that is made up of members AD and BC joined with a pin at C. Consider also Frame 2 which is identical to Frame 1, except that the L-shaped member BC of Frame 1 is replaced by a straight member BC. Let $|(F_C)_1|$ and $|(F_C)_2|$ represent the magnitudes of the forces of pin C on member AD in Frames 1 and 2, respectively

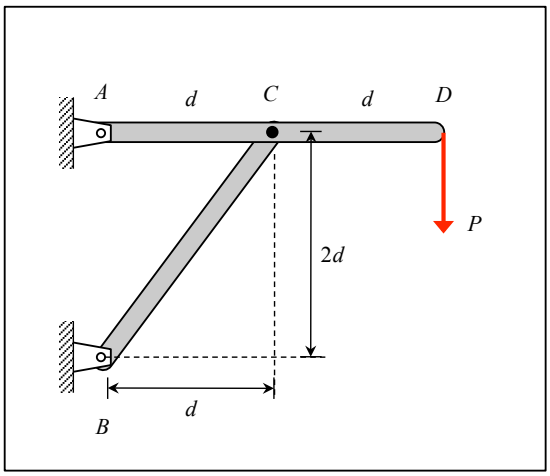
Find: Circle the correct response below regarding the relative sizes of $|(F_C)_1|$ and $|(F_C)_2|$:

- $|(F_C)_1| > |(F_C)_2|$
- $|(F_C)_1| = |(F_C)_2|$
- $|(F_C)_1| < |(F_C)_2|$

Provide an explanation for your answer.



Frame 1



Frame 2

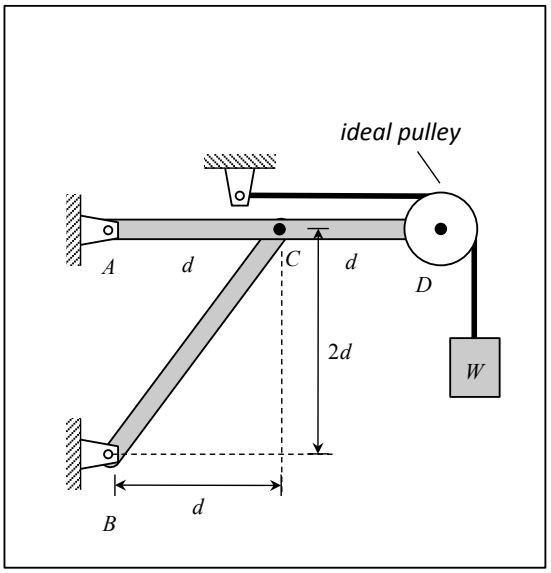
Conceptual Question C8.5

Given: Consider Frame 1 shown below that is made up of members AD and BC joined with a pin at C. An ideal pulley attached to end D of AD supports a block of weight W using a cable. Here, the upper section of the cable is parallel to member AC. Consider also Frame 2 which is identical to Frame 1, except that the upper section of the cable is angled away from link AD, as shown in the figure. Let $|(F_C)_1|$ and $|(F_C)_2|$ represent the magnitudes of the forces of pin C on member AD in Frames 1 and 2, respectively.

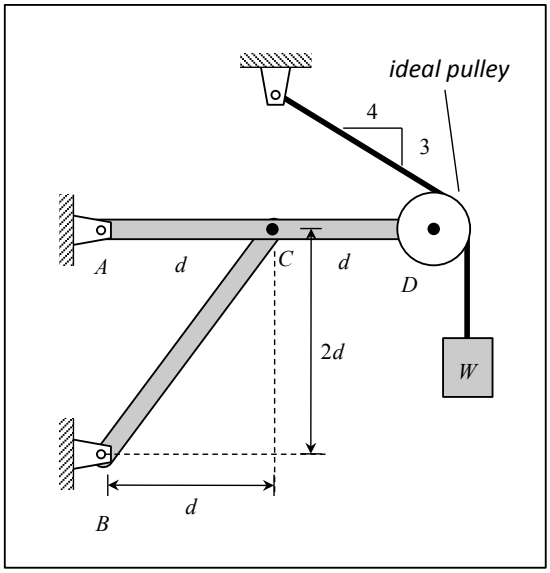
Find: Circle the correct response below regarding the relative sizes of $|(F_C)_1|$ and $|(F_C)_2|$:

- $|(F_C)_1| > |(F_C)_2|$
- $|(F_C)_1| = |(F_C)_2|$
- $|(F_C)_1| < |(F_C)_2|$

Provide an explanation for your answer.



Frame 1



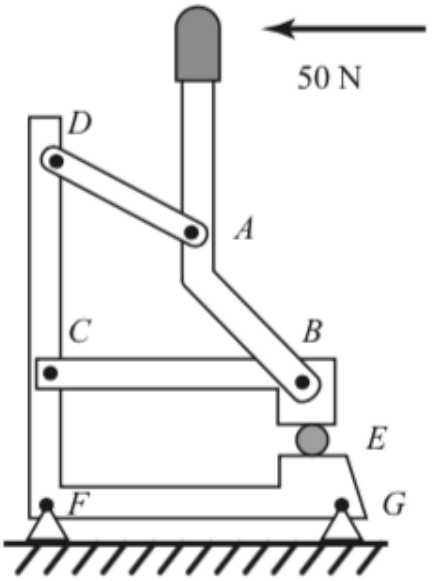
Frame 2

Conceptual Question C8.6

Given: Consider the press mechanism shown below.

Find: For this problem

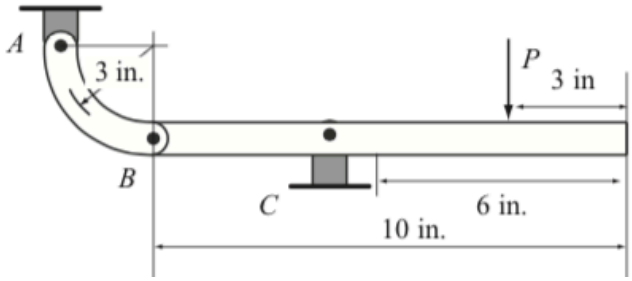
- Draw an FBD for the entire mechanism.
- Identify all two-force members in the mechanism.



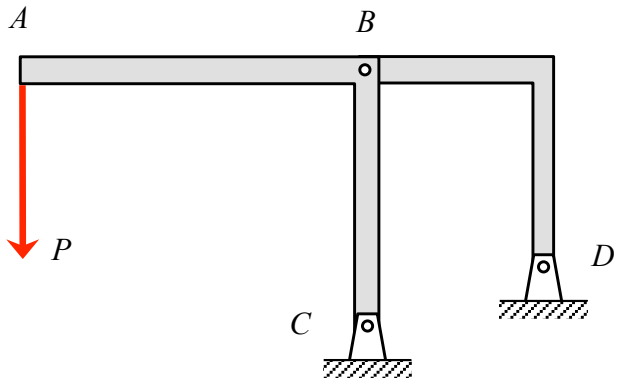
Conceptual Question C8.7

Given: Consider the three structures shown below.

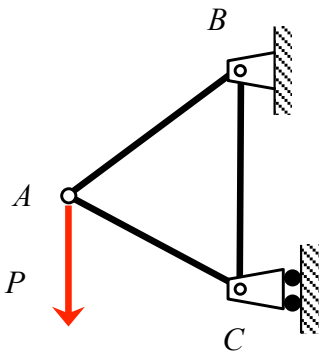
Find: Identify all two-force members in each structure.



Structure (a)



Structure (b)

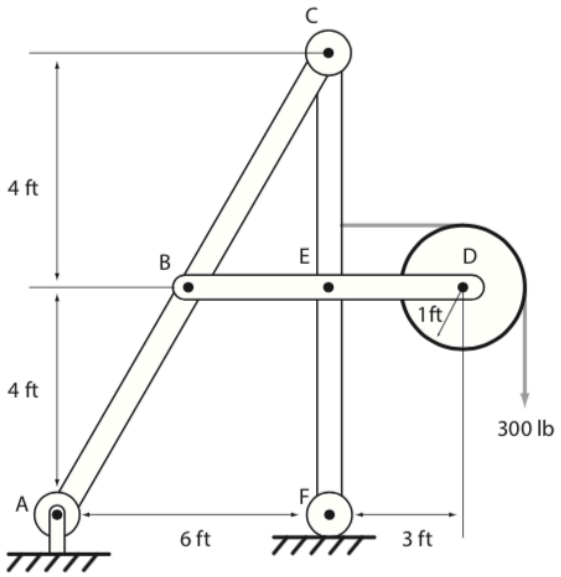


Structure (c)

Conceptual Question C8.8

Given: Consider the frame shown below.

Find: Determine the horizontal and vertical components of the reaction force of member ABC on member CEF as a result of the loading on the frame.

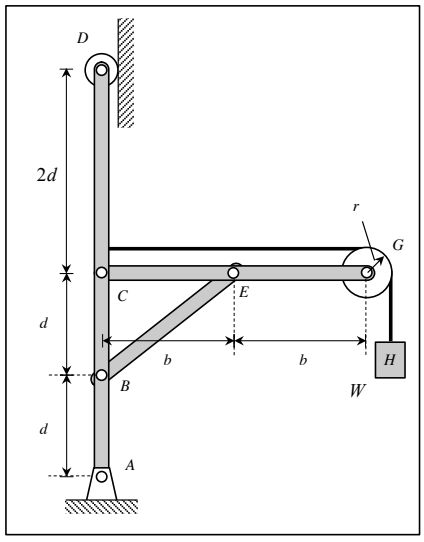


Conceptual Question C8.9

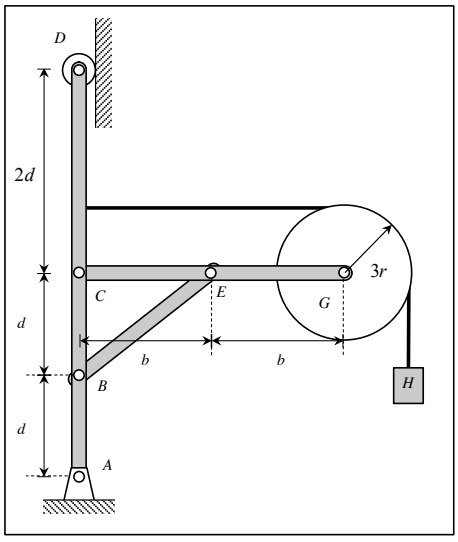
Given: Consider the two structures shown below. Each structure supports block H that has a weight of W, with the weight of the structure being negligible compared to W. The ideal pulley in Structure 1 has a radius of r, whereas the radius of the ideal pulley in Structure 2 has a radius of $3r$. Let $(F_{BE})_1$ and $(F_{BE})_2$ represent the magnitudes of the loads carried by the two-force member BE in Structures 1 and 2, respectively.

Find: Circle the response below that most accurately describes the relative sizes of $(F_{BE})_1$ and $(F_{BE})_2$:

- $(F_{BE})_1 > (F_{BE})_2$
- $(F_{BE})_1 = (F_{BE})_2$
- $(F_{BE})_1 < (F_{BE})_2$



Structure 1



Structure 2