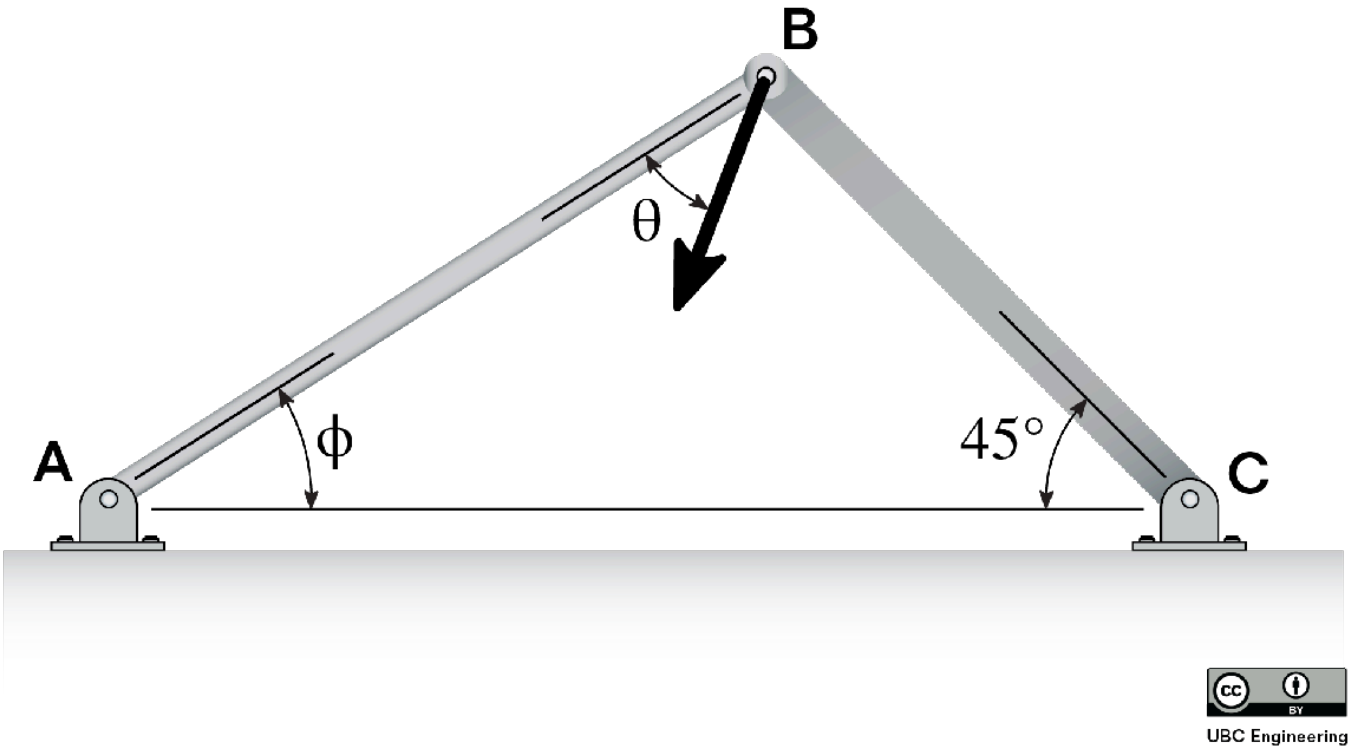

Two members are pin connected at B and are pin connected to the surface at A and C. If a force with magnitude F acts on the frame at the pin connection B such that its component acting along member AB is F_{AB}, directed from B to A, find the angle ϕ ($0^\circ \leq \phi \leq 45^\circ$) and the magnitude of the force component acting along member BC.

Using Cosine Law:

$$F_{BC} = \sqrt{F^2 + {F_{AB}}^2 - 2 \cdot F \cdot F_{AB} \cos(\theta)}$$

Using Sine Law:

$$\frac{F}{\sin(\phi + 45^\circ)} = \frac{F_{BC}}{\sin(\theta)}$$

$$\Rightarrow \phi = \sin^{-1}\left(\frac{F \sin(\theta)}{F_{BC}}\right) - 45^\circ$$