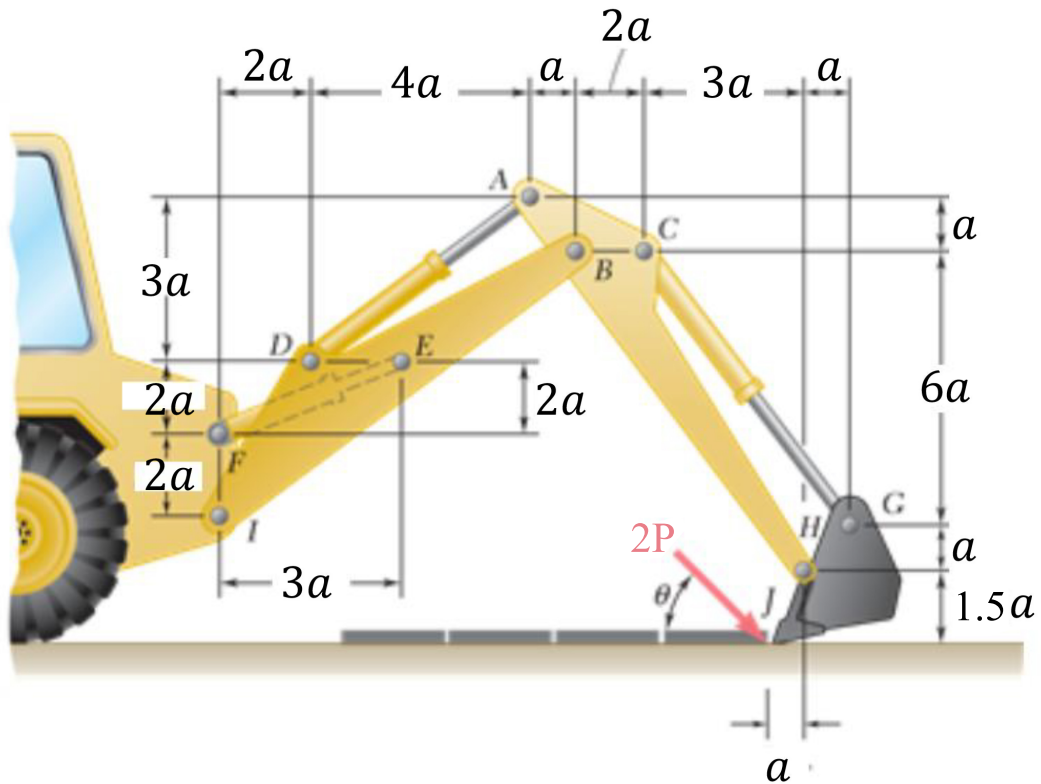


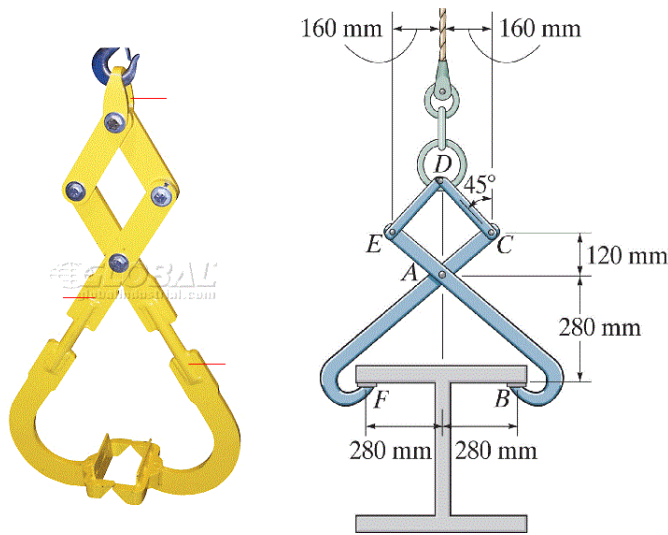
Name: _____

TAM 210/211 Written Assignment 9 (due on March 17th)

The motion of the backhoe bucket illustrated below is controlled by the hydraulic cylinders AD, CG and EF. As a result of an attempt to dislodge a portion of a slab, a force $2P$ is exerted on the bucket at the teeth J. Determine the force exerted by each cylinder. Remember to draw well-labeled free body diagrams.



2) The double link grip is used to lift a beam that weighs 4kN. Hint: when modeling the interaction between the grip and the beam at points F and B , you should consider vertical and horizontal forces.



- Draw the free-body diagram for link CD . Use the method of joint at D to determine the internal force in link CD .
- Draw the free-body diagram for the I-beam. Use the equilibrium equation $(\sum M)_F = 0$ and $\sum F_y = 0$ to determine the vertical reactions that the flange of the beam exerts on the jaw at F and B .
- Draw the free-body diagram for member CAF .
- Use equilibrium equations to determine the horizontal and vertical components of force acting on the pin A .