1) What is the maximum possible value of the clamping force $C$ in the jaws of the pliers shown in the figure if $a = 3.75$ in., $b = 1.60$ in., and the ultimate shear stress in the 0.20-in. diameter pin is 50 ksi?

What is the maximum permissible value of the applied load $P$ if a factor of safety of 3.0 with respect to failure of the pin is to be maintained?

2) Two cables, each having a length $L$ of approximately 40 m, support a loaded container of weight $W$ (see figure). The cables, which have effective cross-sectional area $A = 48.0$ mm$^2$ and effective modulus of elasticity $E = 160$ GPa, are identical except that one cable is longer than the other when they are hanging separately and unloaded. The difference in lengths is $d = 100$ mm. The cables are made of steel having an elastoplastic stress-strain diagram with $\sigma_Y = 500$ MPa. Assume that the weight $W$ is initially zero and is slowly increased by the addition of material to the container.

(a) Determine the weight $W_Y$ that first produces yielding of the shorter cable. Also, determine the corresponding elongation $\delta_Y$ of the shorter cable.

(b) Determine the weight $W_P$ that produces yielding of both cables. Also, determine the elongation $\delta_P$ of the shorter cable when the weight $W$ just reaches the value $W_P$.

(c) Construct a load-displacement diagram showing the weight $W$ as ordinate and the elongation $\delta$ of the shorter cable as abscissa. (*Hint: The load displacement diagram is not a single straight line in the region $0 \leq W \leq W_Y$.*)
3) A horizontal rigid bar \( AB \) supporting a load \( P \) is hung from five symmetrically placed wires, each of cross-sectional area \( A \) (see figure). The wires are fastened to a curved surface of radius \( R \).

(a) Determine the plastic load \( P_p \) if the material of the wires is elastoplastic with yield stress \( \sigma_Y \).

(b) How is \( P_p \) changed if bar \( AB \) is flexible instead of rigid?

(c) How is \( P_p \) changed if the radius \( R \) is increased?