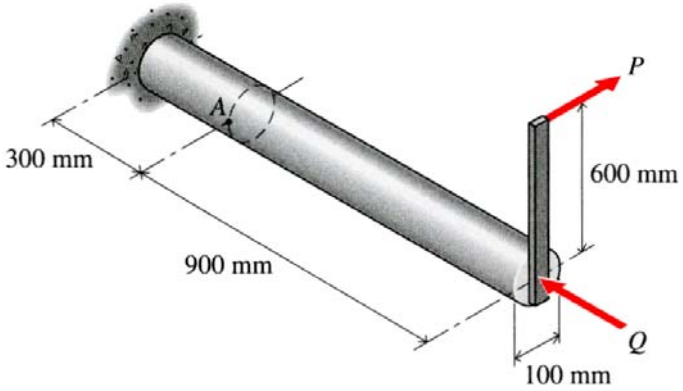
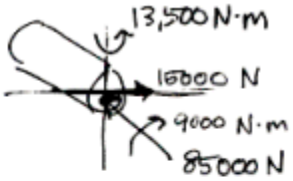
IDE 110 – Summer 2006 Quiz 25 **Name:**_____

A solid shaft 100 mm in diameter is acted on by forces P = 15 kN and Q = 85 kN. Determine the stresses that act at point A on the surface of the shaft and show them on the stress element at the bottom of the page.





Compression $\sigma = \frac{-85000}{\frac{\pi}{4}(.1)^2} = -10.82$ MPa

moment $\sigma = \frac{13,500\,(.05)}{\left(\frac{\pi}{4}\right)(.05^4)} = 137.5$ MPa

torque $\tau = \frac{9000\,(.05)}{\left(\frac{\pi}{2}\right)(.05^4)} = 45.84$ MPa

Shear $\tau = \frac{15,000(.05)(0)}{\frac{\pi}{4}(.05^4)(0)} = 0$