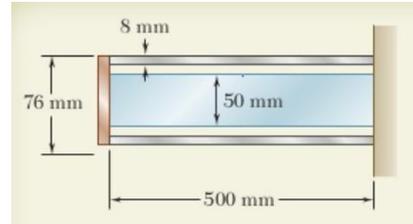


Exam 3
 May 7, 2013
 60 minutes

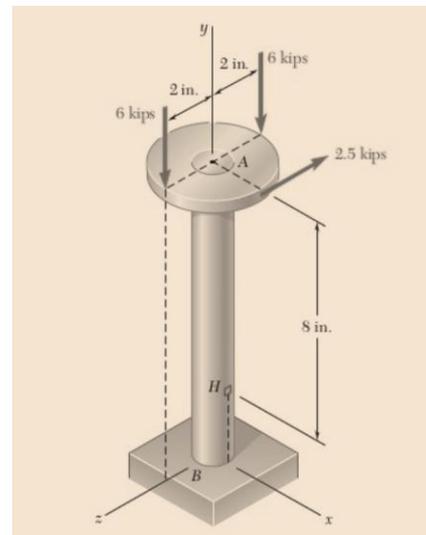
Problem 1 (40 Points)

A steel shaft and an aluminum tube are connected to a fixed support and to a rigid disk as shown in the cross-section below. Knowing that the initial stresses are zero, determine the maximum torque that can be applied to the disk if the allowable stresses are 120MPa in the steel shaft and 70MPa in the aluminum tube. Use $G = 77\text{GPa}$ for steel and $G = 27\text{GPa}$ for aluminum.



Problem 2 (30 Points)

Three forces are applied to a 4-in. diameter plate that is attached to the solid 1.8-in. diameter shaft AB. Determine the normal and shearing stresses at point H.



Problem 3 (30 Points)

For the state of stress shown:

- (a) Compute the normal and shear stress for the shaded region using equilibrium by summing forces.
- (b) Represent this state of stress in terms of the principal stresses and the maximum in plane shear stresses.

