

**AOE 3024: THIN-WALLED STRUCTURES  
TEST – II**

**FALL 2001  
Tuesday, November 13**

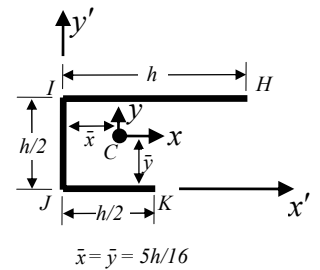
NAME: \_\_\_\_\_

PLEDGE: \_\_\_\_\_

**PROBLEM 1:**

The thin-walled cross section,  $t \ll h$ , shown in the sketch is under the action of a bending moment  $M_x = 1000$  lb-in.

- Determine the normal stress at points  $H, I, J$ , and  $K$ .
- For  $h = 16$  in and  $t = 0.1$  in, determine the locations where the neutral axis intersects the flanges  $HI$  and  $JK$ .

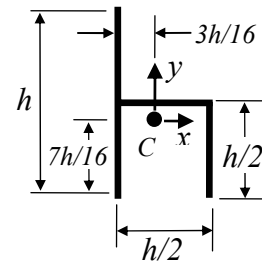


**PROBLEM 2:**

For the thin-walled cross section,  $t \ll h$ , shown in the sketch, the second moment of the area w.r.t. the centroidal axes are:  $I_{xx} = 15th^3 / 128$ ,

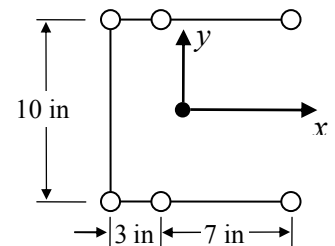
$I_{yy} = 37th^3 / 384$ , and  $I_{xy} = -5th^3 / 128$ .

- Determine the  $x$  coordinate of the shear center
- Determine the  $y$  coordinate of the shear center.



**PROBLEM 3:**

For the idealized section shown in the figure, determine the shear flow under the action of a vertical shear  $V_y > 0$ . The area of all longitudinals is  $1 \text{ in}^2$ .



**PROBLEM 4:**

Compare the maximum shear stress values,  $\tau_{\text{open}}/\tau_{\text{closed}}$ , of the thin-walled ( $t \ll h$ ) triangular tubes, one with a closed section and the other one with a small slit along its entire length, shown in the figure subjected to a torque  $T$ . The cross sections are equilateral triangles with side length of  $h$ .

