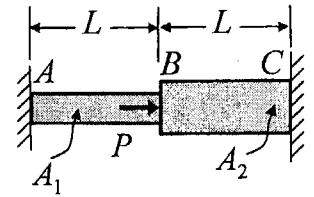


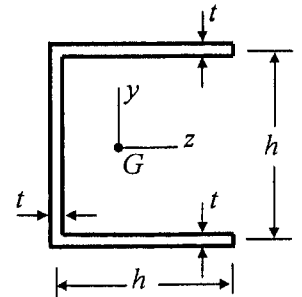
※ 考生請注意：本試題不可使用計算機。請於答案卷(卡)作答，於本試題紙上作答者，不予計分。

1. (25%) A bar having two different cross-sectional areas A_1 and A_2 is held between rigid supports. A load P acts at point B . Determine the reactions at supports A and C due to the load P .



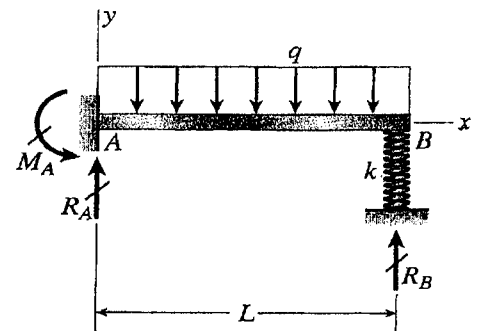
2. (25%) For the thin-walled channel section shown, G is the centroid, and $t \ll h$. Find the location of the shear center.

Hint: the shear stress τ is given as:
$$\tau = \frac{V_y Q_z}{I_z t}$$



where V_y is the shear force in the y direction, Q_z is the first moment of area with respect to the z axis, and I_z is the second moment of area with respect to the z axis.

3. (25%) A uniform cantilever beam AB of length L and flexure rigidity EI has a fixed support at A and a linear-spring support at B (as shown). If a uniform load of intensity q acts on the beam,



- (a) what is the displacement δ_B of end B of the beam?
 (b) Find all the support reactions when the spring constant $k \rightarrow \infty$.

4. (25%) Consider that a uniform bar of circular cross section is subjected to pure torsion T . Please discuss the following three failure modes: shear failure, tension failure, and local buckling, respectively. Explain the possible situations and causes for each of the three types of failure based on stress analysis. (可用中文配合圖形說明)