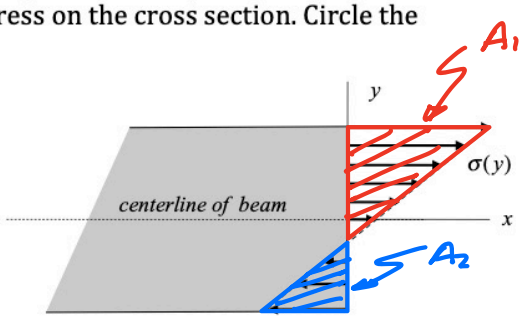
Q1

***Conceptual question 10.1***

The distribution of the normal stress $\sigma$ at the cross section of a beam varies linearly with the coordinate y and is constant in its depth (in z-direction). Let F represent the resultant normal force due to this normal stress on the cross section. Circle the correct answer:

a) $F > 0$ (tensile)
b) $F = 0$
c) $F < 0$ (compressive)

$F = \int \sigma(y)\, dy = A_1 - A_2 > 0$

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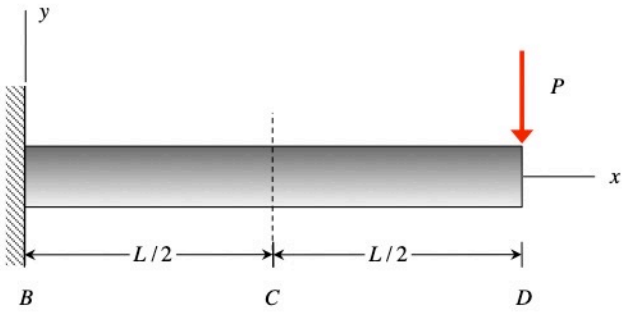
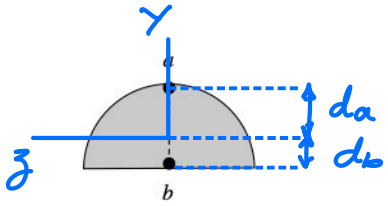
***Conceptual question 10.8***




beam cross section at C

Consider the cantilevered beam above with the concentrated load $P$ at end D. Consider the axial components of stress at points "a" and "b" ($\sigma_a$ and $\sigma_b$, respectively) at location C along the beam. Circle the response below that most accurately describes the relative sizes of the magnitudes of these two stresses:

a) $|\sigma_a| > |\sigma_b|$
b) $|\sigma_a| = |\sigma_b|$
c) $|\sigma_a| < |\sigma_b|$

$|\sigma_a| = \frac{|M|\, d_a}{I}$

$|\sigma_b| = \frac{|M|\, d_b}{I}$

since $d_a > d_b \Rightarrow |\sigma_a| > |\sigma_b|$