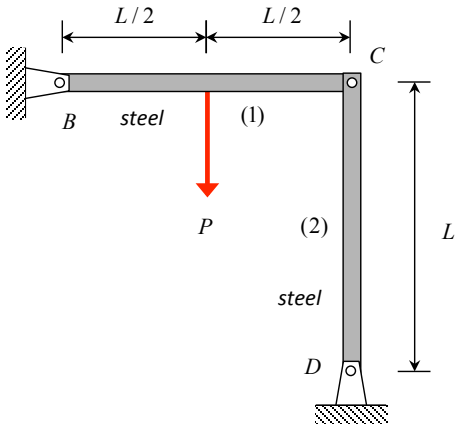
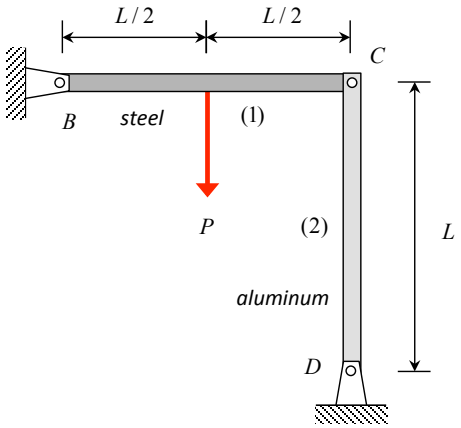
Conceptual question 11.1



Structure (a)



Structure (b)

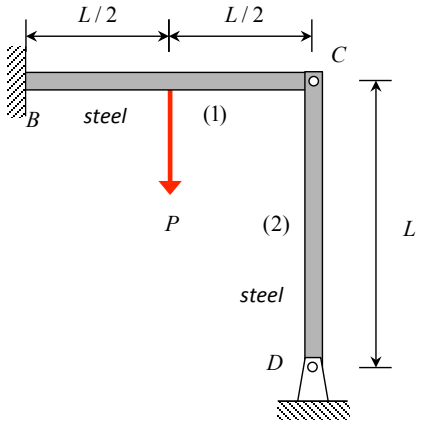
Structures (a) and (b) are identical, except that member (2) in Structure (a) is made of steel and member (2) in Structure (b) is made of aluminum. Let $(\sigma_2)_a$ and $(\sigma_2)_b$ represent the axial stresses in member (2) of Structures (a) and (b), respectively, due to the load P acting on member (1). Circle the item below that describes the relative sizes of these stresses:

i) $\left|(\sigma_2)_a\right| = \left|(\sigma_2)_b\right|$

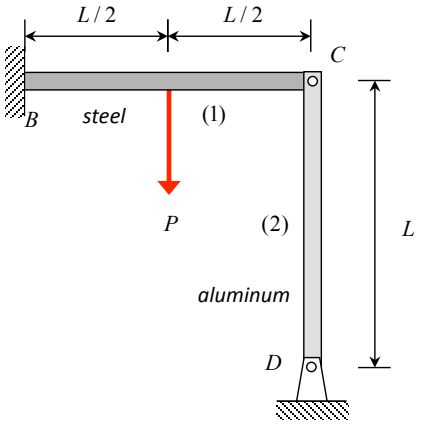
ii) $\left|(\sigma_2)_a\right| \neq \left|(\sigma_2)_b\right|$

iii) more information about the structures is needed in order to answer this question

Conceptual question 11.2



Structure (a)



Structure (b)

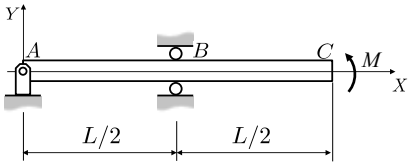
Structures (a) and (b) are identical, except that member (2) in Structure (a) is made of steel and member (2) in Structure (b) is made of aluminum. Let $(\sigma_2)_a$ and $(\sigma_2)_b$ represent the axial stresses in member (2) of Structures (a) and (b), respectively, due to the load P acting on member (a). Circle the item below that describes the relative sizes of these stresses:

i) $\left|(\sigma_2)_a\right| = \left|(\sigma_2)_b\right|$

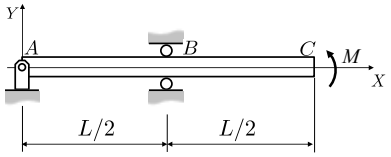
ii) $\left|(\sigma_2)_a\right| \neq \left|(\sigma_2)_b\right|$

iii) more information about the structures is needed in order to answer this question

Conceptual question 11.3



Beam (i) – Steel



Beam (ii) – Aluminum

Beams (i) and (ii) shown above are identical, except that beam (i) is made up of steel and beam (ii) is made up of aluminum. Note that $E_{steel} \geq E_{aluminum}$.

Let $|\sigma|_{max,(i)}$ and $|\sigma|_{max,(ii)}$ represent the maximum magnitude of flexural stress in beams (i) and (ii), respectively. Circle the correct relationship between these two stresses:

a) $|\sigma|_{max,(i)} > |\sigma|_{max,(ii)}$

b) $|\sigma|_{max,(i)} = |\sigma|_{max,(ii)}$

c) $|\sigma|_{max,(i)} < |\sigma|_{max,(ii)}$

Let $|\tau|_{max,(i)}$ and $|\tau|_{max,(ii)}$ represent the maximum magnitude of the xy-component of shear stress in beams (i) and (ii), respectively. Circle the correct relationship between these two stresses:

a) $|\tau|_{max,(i)} > |\tau|_{max,(ii)}$

b) $|\tau|_{max,(i)} = |\tau|_{max,(ii)}$

c) $|\tau|_{max,(i)} < |\tau|_{max,(ii)}$

Let $|\delta|_{max,(i)}$ and $|\delta|_{max,(ii)}$ represent the maximum magnitude of deflection in beams (i) and (ii), respectively. Circle the correct relationship between these two stresses:

a) $|\delta|_{max,(i)} > |\delta|_{max,(ii)}$

b) $|\delta|_{max,(i)} = |\delta|_{max,(ii)}$

c) $|\delta|_{max,(i)} < |\delta|_{max,(ii)}$

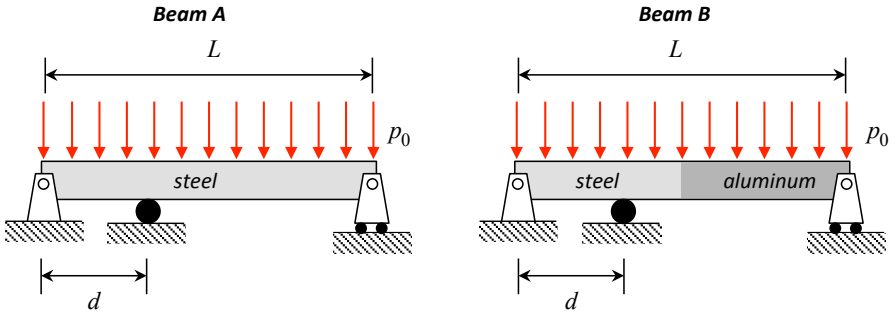
Let $|B_y|_{(i)}$ and $|B_y|_{(ii)}$ represent the vertical reaction at B in beams (i) and (ii), respectively. Circle the correct relationship between these two stresses:

a) $|B_y|_{(i)} > |B_y|_{(ii)}$

b) $|B_y|_{(i)} = |B_y|_{(ii)}$

c) $|B_y|_{(i)} < |B_y|_{(ii)}$

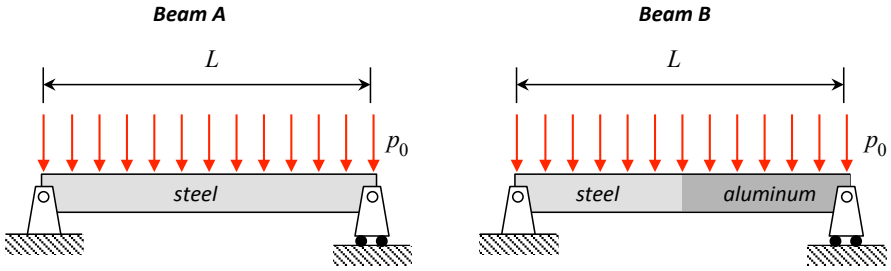
Conceptual question 11.4



Beam A is made up of *steel* and is acted upon by a constant line load (force/length) p_0 and is supported as shown above. Beam B is identical to Beam A except it is made up of steel and aluminum sections, as shown above. Let $(\sigma_{max})_A$ and $(\sigma_{max})_B$ be the maximum flexural stresses in Beams A and B, respectively.

TRUE or FALSE: $(\sigma_{max})_A = (\sigma_{max})_B$

Conceptual question 11.5

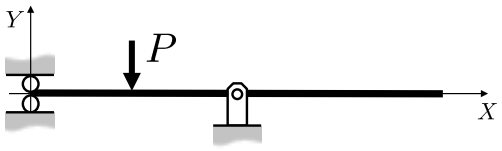


Beam A is made up of *steel* and is acted upon by a constant line load (force/length) p_0 and has simply-supported boundary conditions. Beam B is identical to Beam A except it is made up of steel and aluminum sections, as shown above. Let $(\sigma_{max})_A$ and $(\sigma_{max})_B$ be the maximum flexural stresses in Beams A and B, respectively.

TRUE or FALSE: $(\sigma_{max})_A = (\sigma_{max})_B$

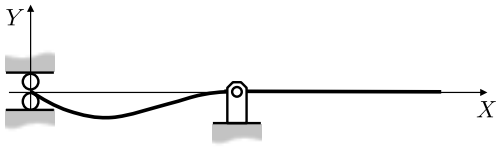
Conceptual question 11.6

Indicate which of the schematics presented below depicts the deflection curve of the following beam:

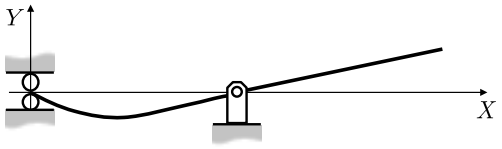


Circle the correct answer (a) (b) (c) (d)

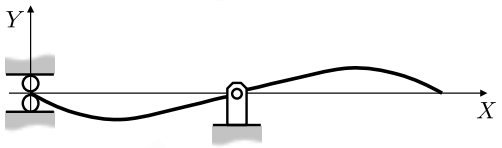
(a)



(b)



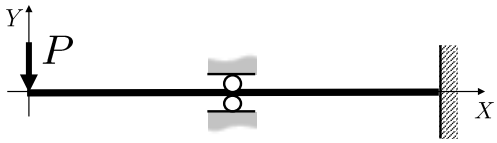
(c)



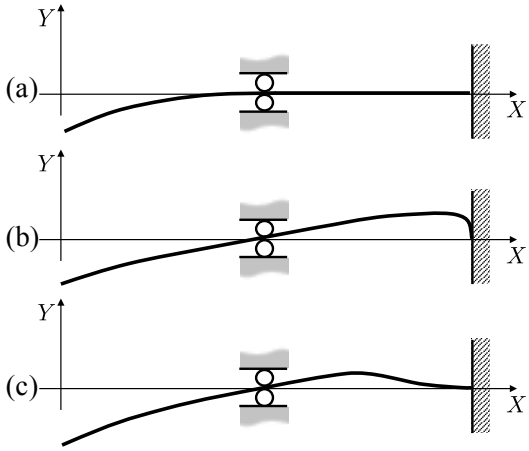
(d) None of the above .

Conceptual question 11.7

Indicate which of the schematics presented below depicts the deflection curve of the following beam:



Circle the correct answer (a) (b) (c) (d)



(d) None of the above .