

R.D. N° 2

5.25
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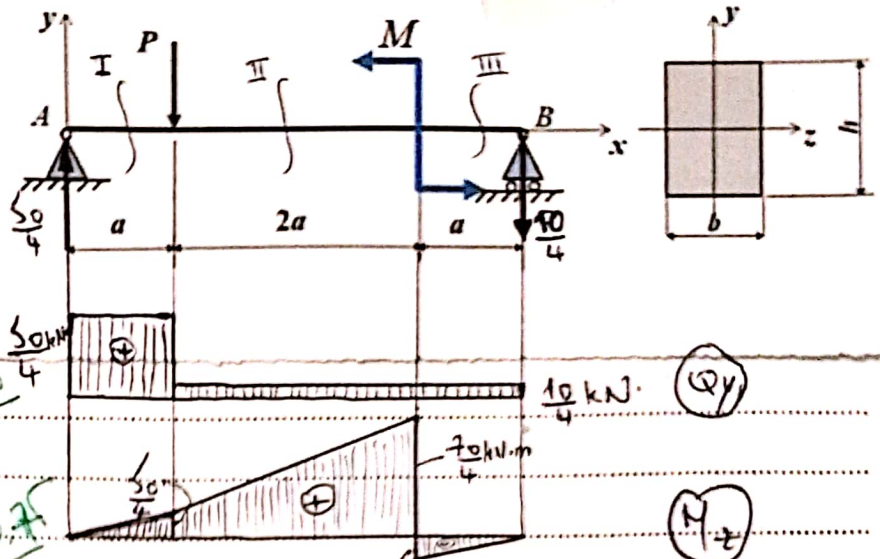
Interrogation écrite n° 1
Corrigé type

1/ Diagrammes Q_y et M_z

Réactions aux appuis:

$R_A = \frac{50}{4} \text{ kN} \uparrow$

$R_B = \frac{10}{4} \text{ kN} \downarrow$



Section I : $0 \leq x \leq a$

$Q_y = \frac{50}{4} \text{ kN}$

$M_z = \frac{50}{4} \cdot x$
 $\begin{cases} M_z = 0 \rightarrow x = 0 \\ M_z = \frac{50}{4} \text{ kN} \cdot \text{m} \rightarrow x = a \end{cases}$

Section II : $a \leq x \leq 3a$

$Q_y = \frac{50}{4} - 10 = \frac{10}{4} \text{ kN}$

$M_z = \frac{50}{4} \cdot x - 10 \cdot (x - a)$
 $\begin{cases} M_z = \frac{50}{4} \text{ kN} \cdot \text{m} \rightarrow x = a \\ M_z = \frac{70}{4} \text{ kN} \cdot \text{m} \rightarrow x = 3a \end{cases}$

Section III : $0 \leq x \leq a$

$Q_y = \frac{10}{4} \text{ kN}$

$M_z = -\frac{10}{4} \cdot x$
 $\begin{cases} M_z = 0 \rightarrow x = 0 \\ M_z = -\frac{10}{4} \text{ kN} \cdot \text{m} \rightarrow x = a \end{cases}$

2/ Vérification de la condition de résistance.

$[\sigma] = 100 \frac{\text{N}}{\text{mm}^2}$

$\sigma_{\max} \leq [\sigma]$

$\sigma_{\max} = \frac{|M_{z\max}|}{W_z}$

$M_{z\max} = \frac{70}{4} \text{ kN} \cdot \text{m} = \frac{70}{4} \cdot 10^3 \text{ N} \cdot \text{m}$

$W_z = \frac{bh^2}{6} = \frac{h^3}{12} = 228,67 \text{ cm}^3 = 228,67 \cdot 10^3 \text{ mm}^3$

La résistance est bien vérifiée, puisque:

$\sigma_{\max} = 46,52 \frac{\text{N}}{\text{mm}^2} < 100 \frac{\text{N}}{\text{mm}^2}$