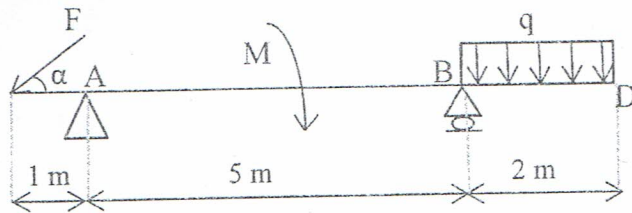


Interrogation de mécanique rationnelle

Exercice

Une barre est soumise aux actions d'un couple des forces de moment $M = 2 \text{ KN} \cdot \text{m}$, d'une force concentrée $F = 3 \text{ KN}$ et d'une charge uniformément réparties $q = 0.75 \text{ KN/m}$. avec $\alpha = 30^\circ$

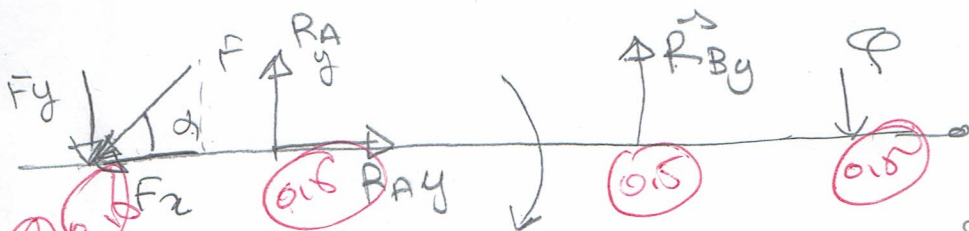
Déterminer les réactions des appuis?



le probleme -> 2
 inter 1 -> 3
 inter 2 -> 1 5

⇓ Equivalence

La durée 30 min



$$\begin{cases} \sum F_{ext} = 0 \\ \sum \vec{\pi} / A = 0 \end{cases}$$

$$q = q \times l = 0.75 \times 2 = 1.5$$

$$\begin{pmatrix} 0 \\ -q \end{pmatrix} + \begin{pmatrix} 0 \\ R_{By} \end{pmatrix} + \begin{pmatrix} R_{Ax} \\ R_{Ay} \end{pmatrix} + \begin{pmatrix} -F \cos \alpha \\ -F \sin \alpha \end{pmatrix} = \begin{pmatrix} 0 \\ 0 \end{pmatrix}$$

$$R_{Ax} - F \cos \alpha = 0 \Rightarrow R_{Ax} = F \cos \alpha = 3 \text{ KN} \times \cos 30^\circ = 2.59 \text{ KN}$$

$$-q + R_{By} + R_{Ay} - F \sin \alpha = 0$$

$$\sum \vec{\pi} / A = 0 \Rightarrow \begin{pmatrix} -1 \\ 0 \end{pmatrix} \wedge \begin{pmatrix} -F \cos \alpha \\ -F \sin \alpha \end{pmatrix} + \begin{pmatrix} 1 \\ 0 \end{pmatrix} \wedge \begin{pmatrix} 0 \\ R_{By} \end{pmatrix} + \begin{pmatrix} 6 \\ 0 \end{pmatrix} \wedge \begin{pmatrix} 0 \\ -q \end{pmatrix} = 0$$

$$F \sin \alpha + 5 R_{By} + 6 \times 9 - 17 = 0$$

$$5 R_{By} = 6 \times 9 + 17 - F \sin \alpha \Rightarrow R_{By} = \frac{6 \times 9 + 17 - F \sin \alpha}{5}$$

$$1.5 + 5 R_{By} - \frac{0.75 \times 6 - 2}{6.5} = 0$$

$$\Rightarrow R_{By} = \frac{0.75 \times 6 + 2 - 1.5}{5} = 1 \text{ kN}$$

$$R_{Ay} = F \sin 30 + 9 - R_{By} = 1.5 + 0.75 - 1 = 1.25 \text{ kN}$$

$$R_A = \sqrt{R_{Ax}^2 + R_{Ay}^2} = \sqrt{(2.59)^2 + (1.25)^2}$$

$$R_B = \sqrt{R_{Bx}^2 + R_{By}^2} = 1 \text{ kN}$$