Université A / MIRA de Béjaia **27/06/2012**
Faculté de la Technologie
Département ST 2

EXAMEN DE RATTRAPAGE DE RDM

(Durée 2 H)

EX 1 : (8 points)

Déterminer les réactions engendrées dans les appuis des poutres indiquées dans les figures 1 et 2 ci-dessous.

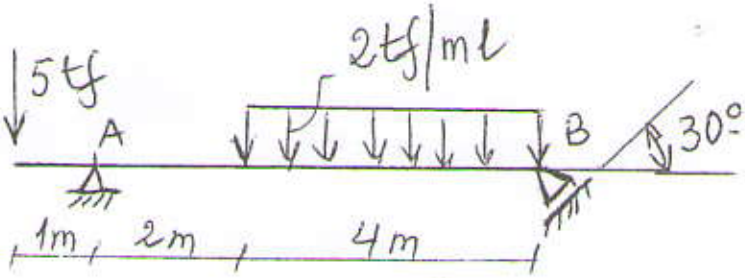


fig 1

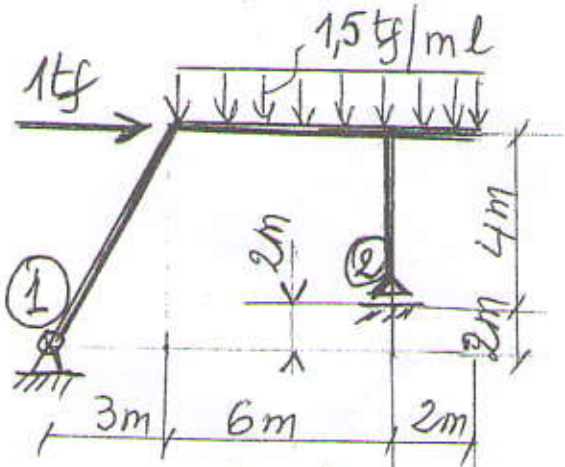


fig 2

EX 2 : (12 points)

Pour les poutres indiquées dans les figures 3 et 4 ci-dessous, calculer et tracer les diagrammes de l'effort tranchant et du moment fléchissant.

fig 3

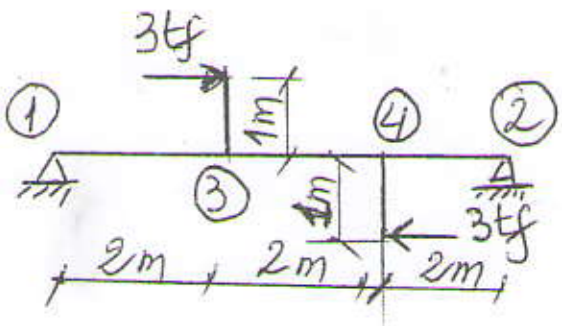
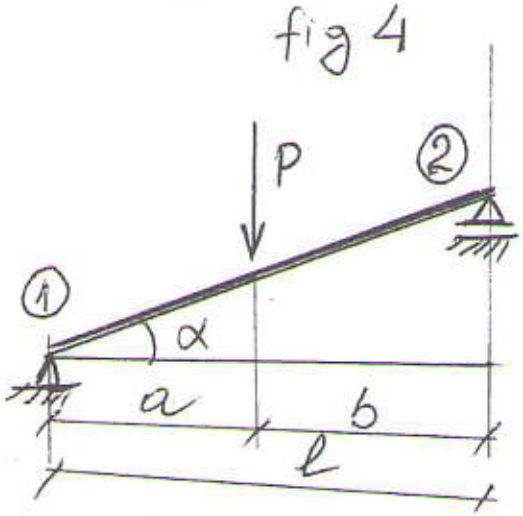


fig 4



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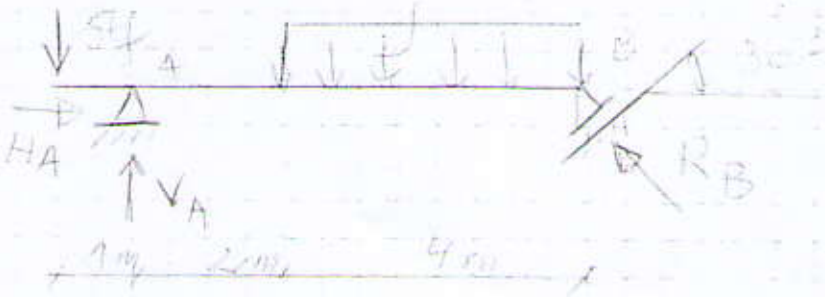
Ex 1 4pts

①



$\Sigma M/_B = 0 \Rightarrow -5\times 7 + V_A \times 6 - 2\times 4\times 2 = 0$

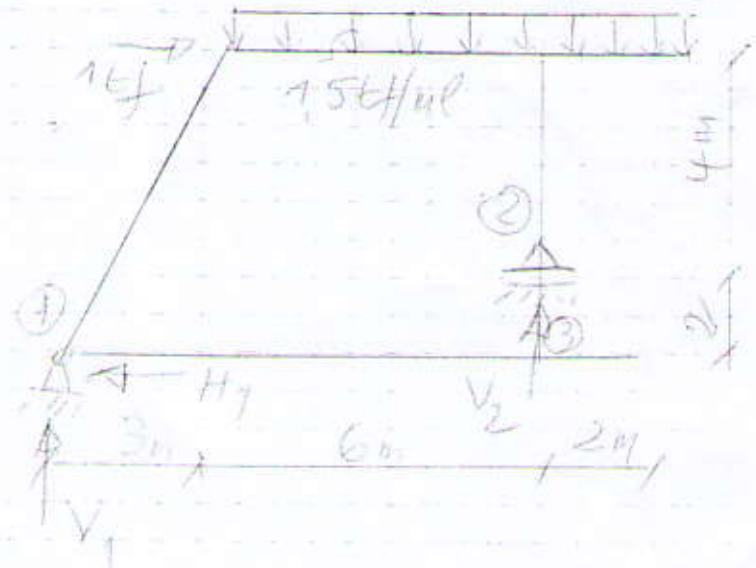
$\Rightarrow V_A = 8,5$ tf 2pts

$\Sigma M/_A = 0 \Rightarrow -5\times 1 + 2\times 4(2+4) - R_B \sin 30 \times 6 = 0$

$\Rightarrow R_B = 5,196$ tf 2pts

$\Sigma F_x = 0 \Rightarrow H_A - R_B \cos 30 = 0 \Rightarrow H_A = 2,598$ tf

②



$\Sigma M/_③ = 0$

$\Rightarrow V_1 \times 9 + 1\times 6 - 1,5\times 8\times 2 = 0$

$\Rightarrow V_1 = 2$ tf (1,5pt)

$\Sigma M/_① = 0 \Rightarrow 1\times 6 + 1,5\times 8\times 7 - V_2 \times 9 = 0$

$\Rightarrow V_2 = 10$ tf (1,5pt)

$\Sigma F_x = 0 \Rightarrow -H_1 + 1 = 0 \Rightarrow H_1 = 1$ tf (1pt)

Ex 2

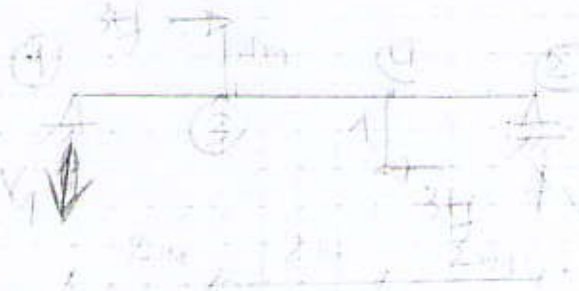


Fig 3

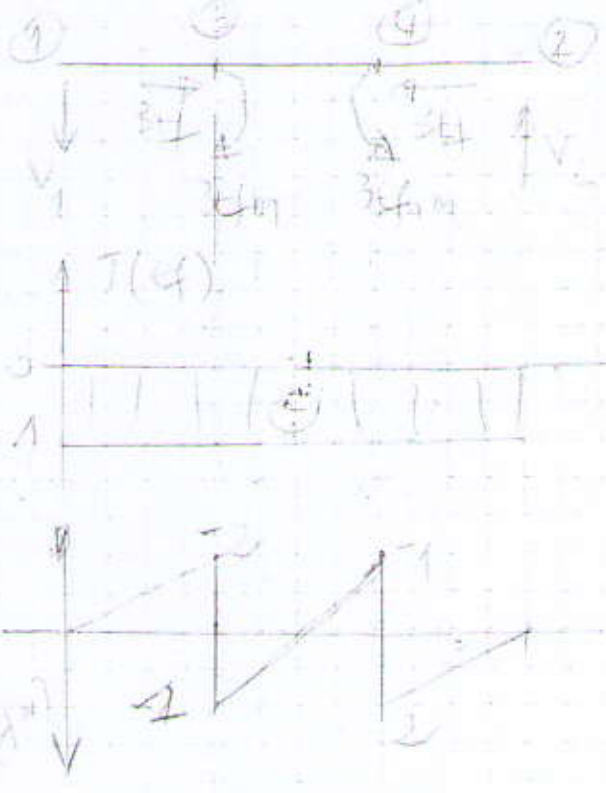


Schéma statique équivalent

(1 pt)

(1,5 pt)

$V_1 = V_2 = (3+3)/6 = 1\,tf$

$T_1 = -1\,tf$ (1 pt)

$0 \leq x \leq 2$

$M(x) = -V_1 x = -1 \times x$

$M(0) = 0$

$M(2) = -2\,tf.m$

$M(3) = -3 + 3 = 1\,tf.m$ (1 pt)

$2 \leq x \leq 4$

$M(x) = -V_1 x + 3 = -1.x + 3$

$M(2) = 1\,tf.m$

$M(4) = -1\,tf.m$ (1 pt)

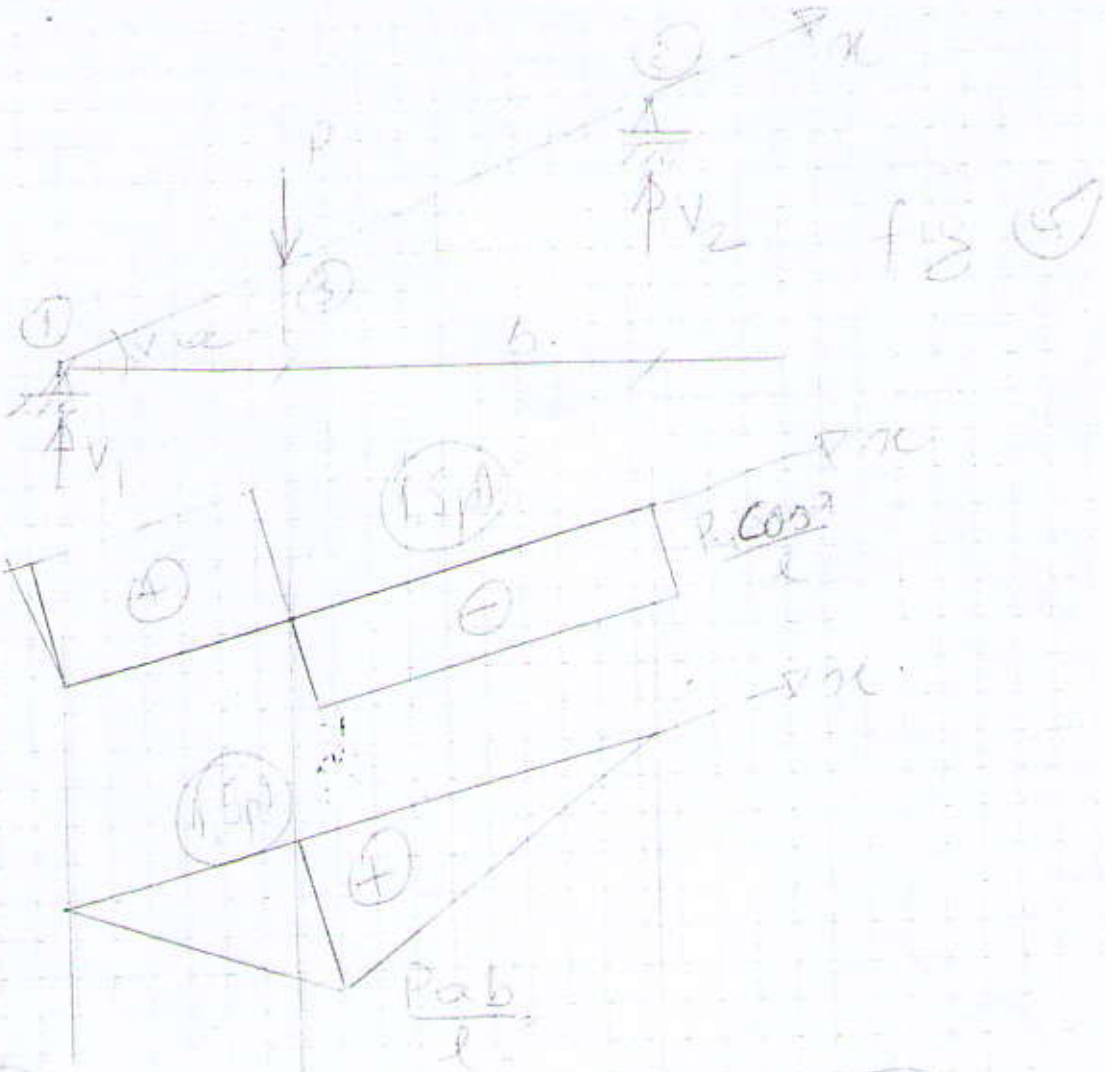
$M(4) = -4 + 3 = -1\,tf.m$

$4 \leq x \leq 6$ $M(x) = -V_1 . x + 3 + 3 = -1x + 6$

$M(4) = -2\,tf.m$

$M(6) = 0$ (1 pt)

/ Cpt:



$V_1 = \frac{Pb}{\ell}$ $\quad V_2 = Pa/\ell$

Efforts tranchants

$0 \le x \le 3$ $\quad T(x) = V_1 \cos x = Pb\cos x / \ell$

$T(3) = V_1 \cos x - P\cos x = -Pa\cos x / \ell$

Moment fléchissant

$M_{max} = M(3) = V_1 \cdot a = Pab/\ell$