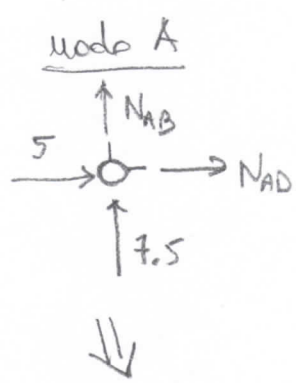
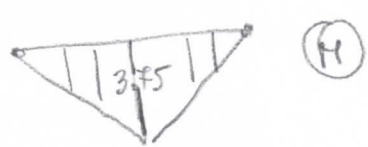
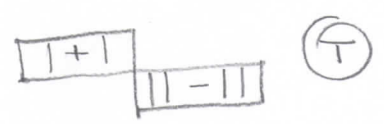
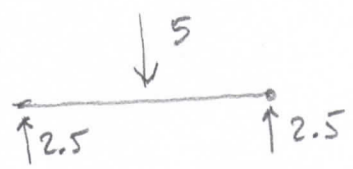
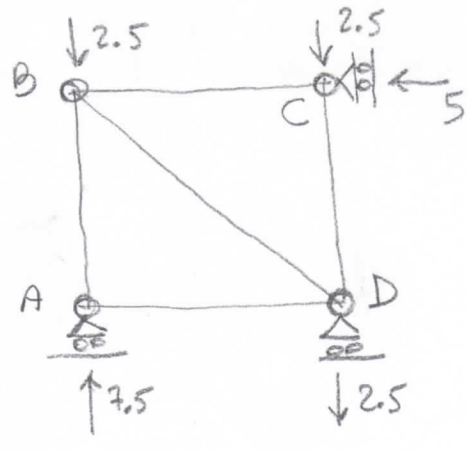
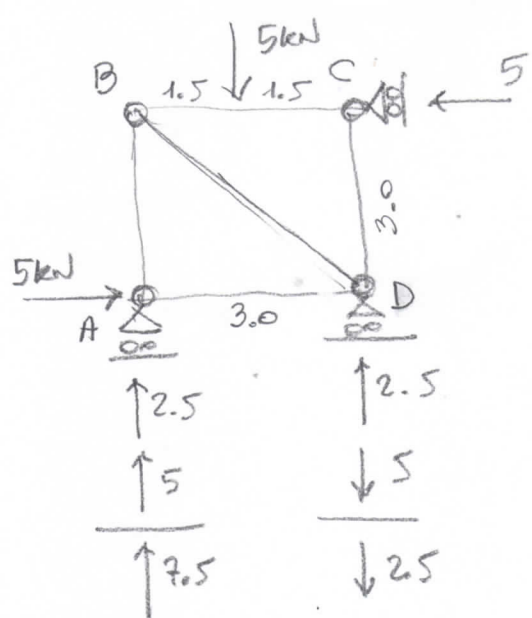


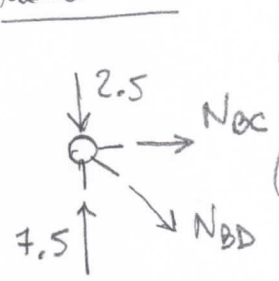
ES. 1



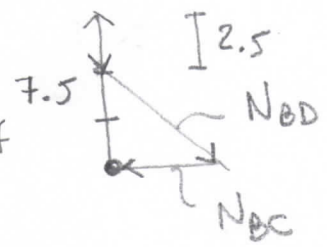
$$N_{AB} = -7.5$$

$$N_{AD} = -5$$

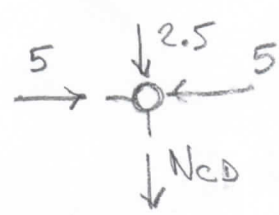
modo B



$$\begin{cases} N_{bc} + N_{bd} \frac{\sqrt{2}}{2} = 0 \\ +5 - N_{bd} \frac{\sqrt{2}}{2} = 0 \end{cases} \Rightarrow \begin{cases} N_{bc} = -5 \\ N_{bd} = 5\sqrt{2} = 7.07 \end{cases}$$

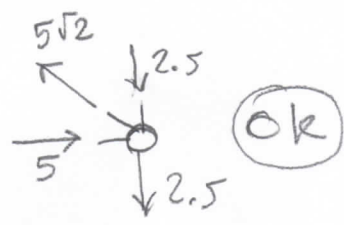


modo C

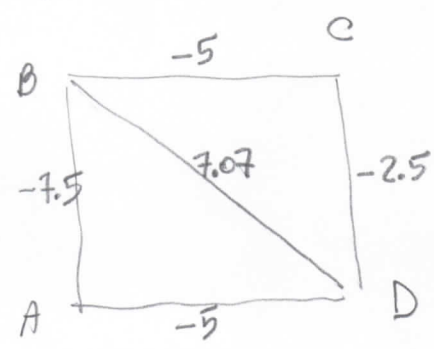
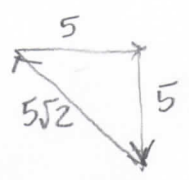


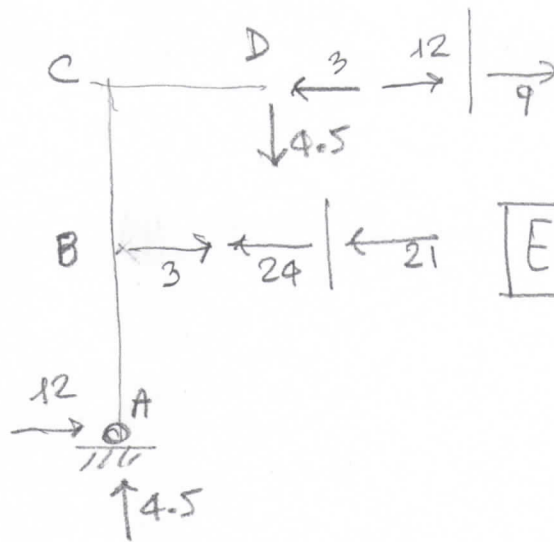
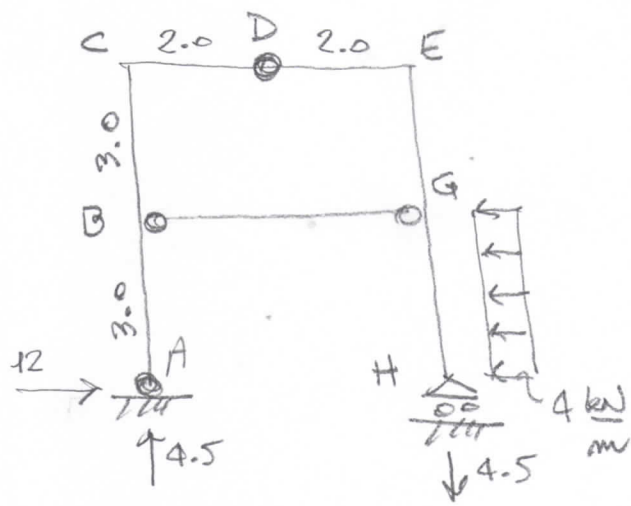
$$N_{cd} = -2.5$$

check modo D

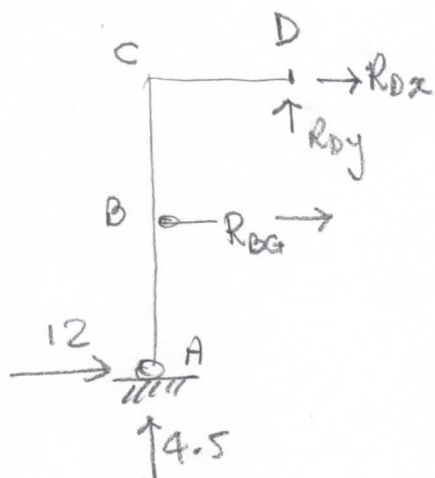


OK





oppure



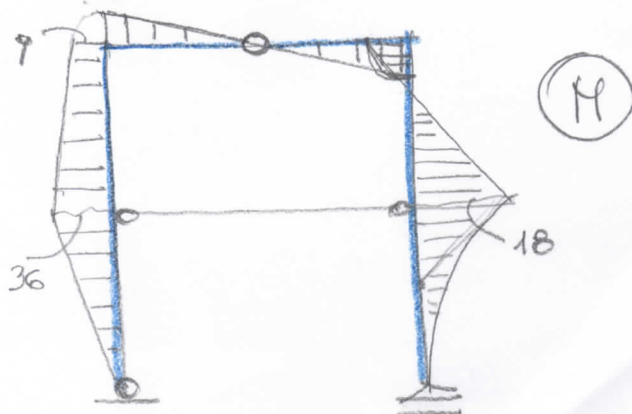
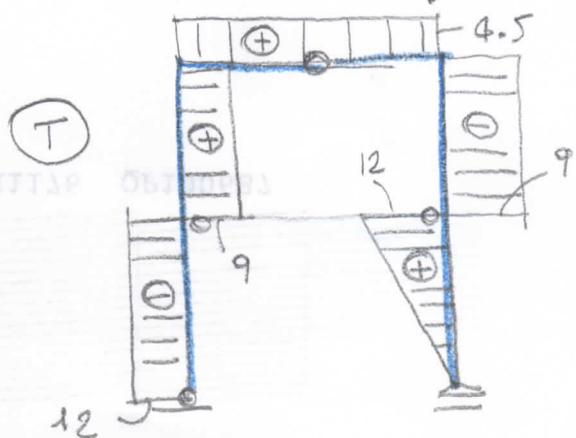
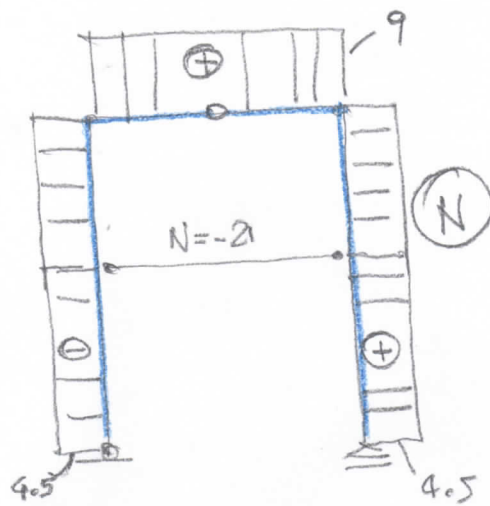
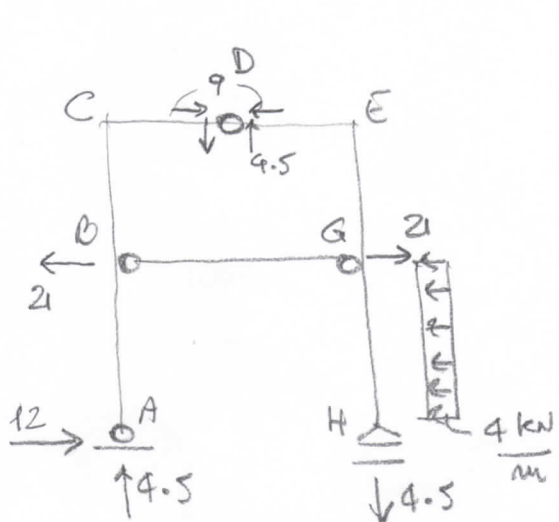
$$D) \quad 12 \times 6 - 4.5 \times 2 + R_{BG} \times 3 = 0$$

$$\Downarrow$$

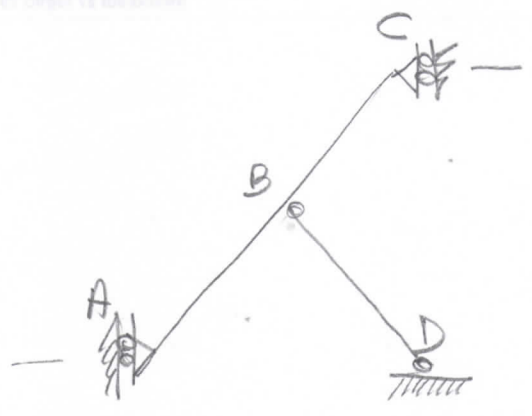
$$R_{BG} = \frac{9 - 72}{3} = -\frac{63}{3} = -21$$

$$R_{By} + 4.5 = 0 \Rightarrow R_{By} = -4.5$$

$$R_{Dx} - 21 + 12 = 0 \Rightarrow R_{Dx} = 9$$



ES. 3



ISOSTATICA

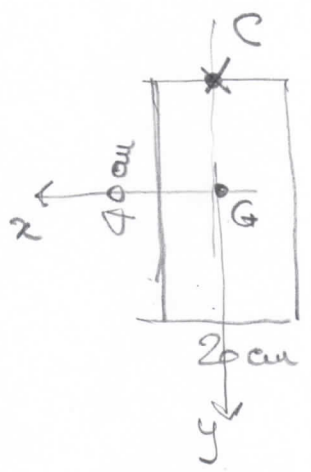
$(A+C \Rightarrow)$ cerniera impropria $\equiv \infty$

\Downarrow
arco e 3 cerniere non allineate

oppure $A + BD =$ cerniera in D

\Downarrow
Trave cern. (D) - cern. (C) non allineate

ES. 4



$N_C = -20 \text{ kN}$

$N_G = -20 \quad M_G = 20 \times 0.2 = 4 \text{ kNm}$

$A = 20 \times 40 = 800 \text{ cm}^2$

$I_z = \frac{20 \times 40^3}{12} = 106667 \text{ cm}^4$

$$\sigma_z = \frac{N}{A} + \frac{M_z}{I_z} y = - \frac{20 \times 1000 \text{ N}}{800 \times 100 \text{ mm}^2} + \frac{4 \cdot 10^6 \text{ N} \cdot \text{mm}}{106667 \times 10^4} y$$

$$\sigma_z = -0.25 + 0.00375 y \quad y = 6.7 \text{ mm} \text{ (per caso in esame con } \sigma \text{ costante con } H/6)$$

$$CG \cdot d_{G-u} = \frac{106667}{800} \Rightarrow d_{G-u} = \frac{106667}{800 \times 20} = 6.7 \text{ cm}$$

$$\sigma_z^{\text{max comp}} = -0.25 + 0.00375 \times (-200) = -1 \frac{\text{N}}{\text{mm}^2}$$

$$\sigma_z^{\text{max trat}} = -0.25 + 0.00375 \times 200 = 0.5 \frac{\text{N}}{\text{mm}^2}$$

