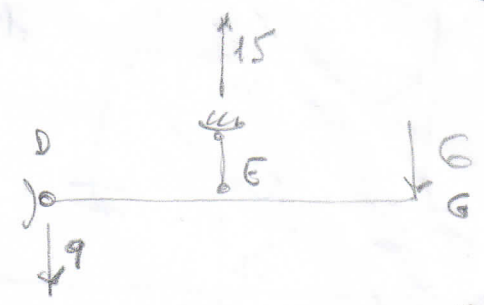
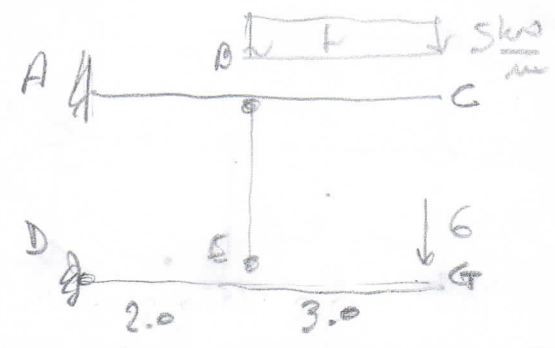
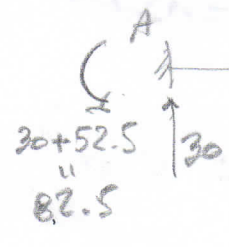
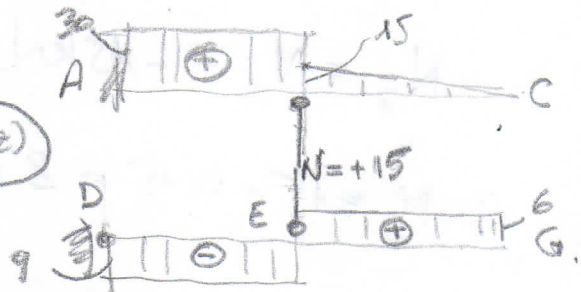


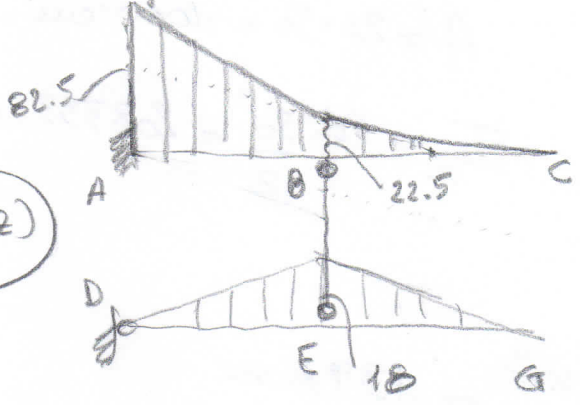
ES.1



$T(z)$

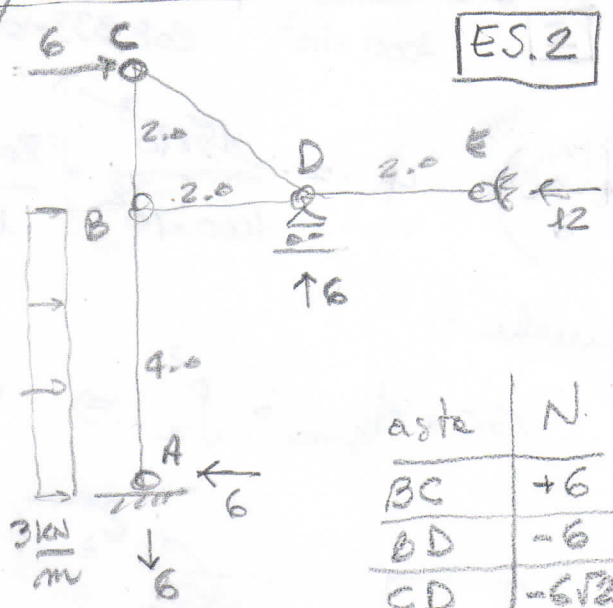


$H(z)$

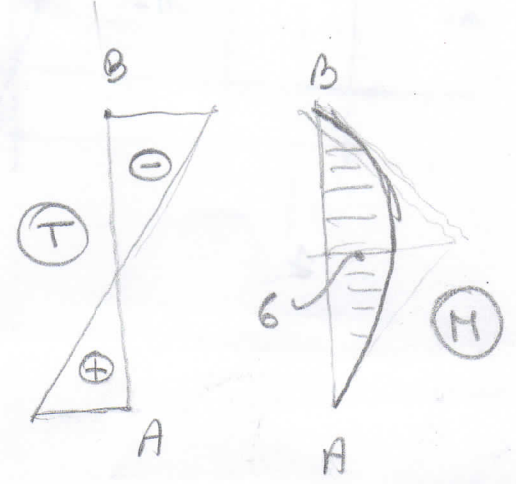
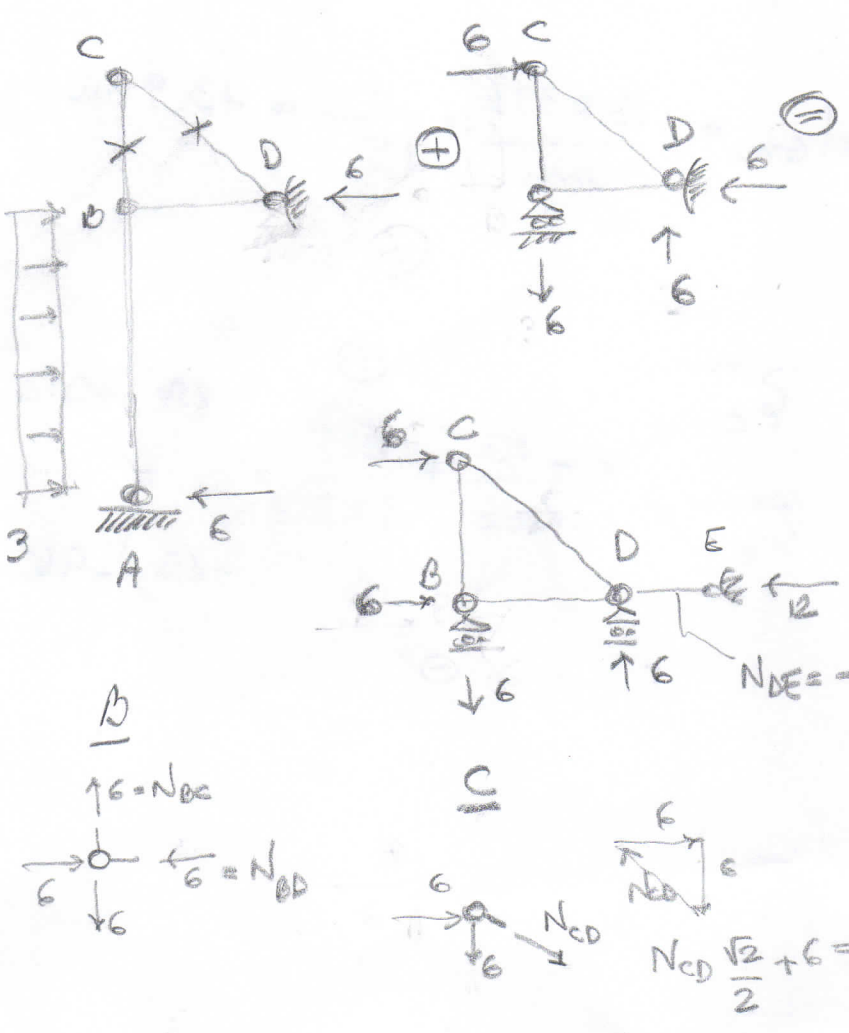


$$\Delta e_{BE} = \frac{15000 \cdot 3000}{15000 \times 500} = 6 \text{ mm}$$

ES.2

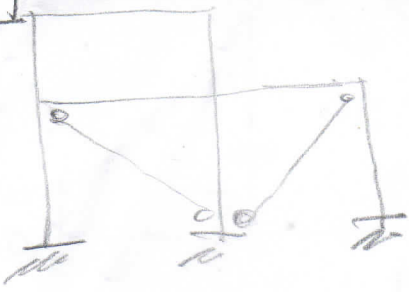


aste	N
BC	+6
BD	-6
CD	$-6\sqrt{2} = 8.49$

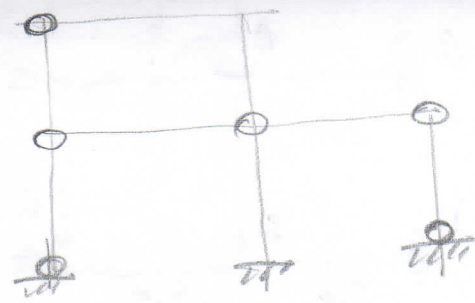


$$N_{CD} \frac{\sqrt{2}}{2} + 6 = 0 \Rightarrow N_{CD} = -6\sqrt{2}$$

ES.3

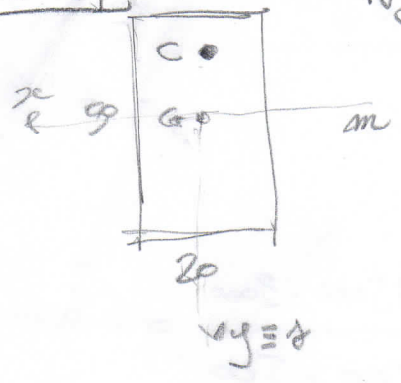


11 ép.



15.

ES.4



$$N_c = -15 \text{ kN}$$

$$N_G = N_c = -15 \text{ kN}$$

$$M_x = 15 \times 0.15 = 2.25 \text{ kNm}$$

$$A = 20 \times 50 = 1000 \text{ cm}^2$$

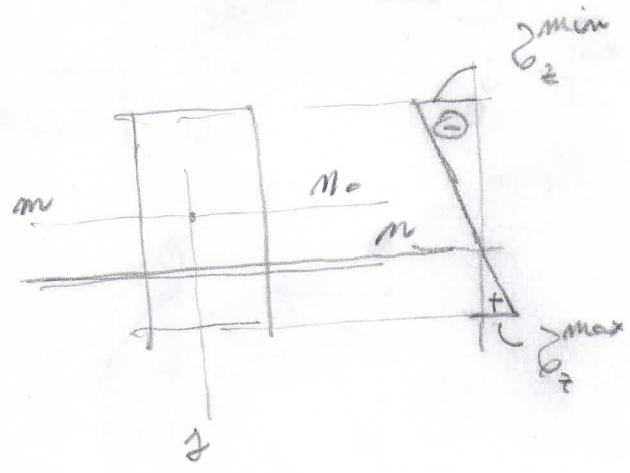
$$I_x = \frac{20 \times 50^3}{12} = 208333 \text{ cm}^4$$

$$I_z = -\frac{15 \times 10^3}{1000 \times 10^2} + \frac{2.25 \times 10^6}{208333 \times 10^4} y$$

$$n-n) \quad y = \frac{15 \times 10^3}{1000 \times 10^2} \cdot \frac{208333 \times 10^4}{15 \times 0.15 \times 10^6} = 139 \text{ mm}$$

aussi :

$$G_c \times d_{G-m} = I_z \Rightarrow d_{G-m} = \frac{208333}{1000} \times \frac{1}{15} = 13.9 \text{ cm}$$



$$\begin{aligned} \sigma_z^{\max} &= -\frac{150}{1000} + \frac{225}{208333} \times 250 = 0.12 \\ \sigma_z^{\min} &= -\frac{150}{1000} + \frac{225}{208333} \times (-250) = -0.42 \end{aligned}$$