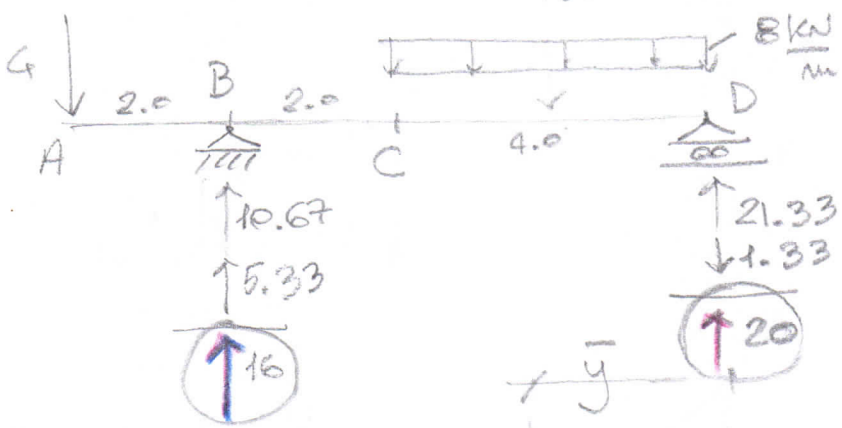
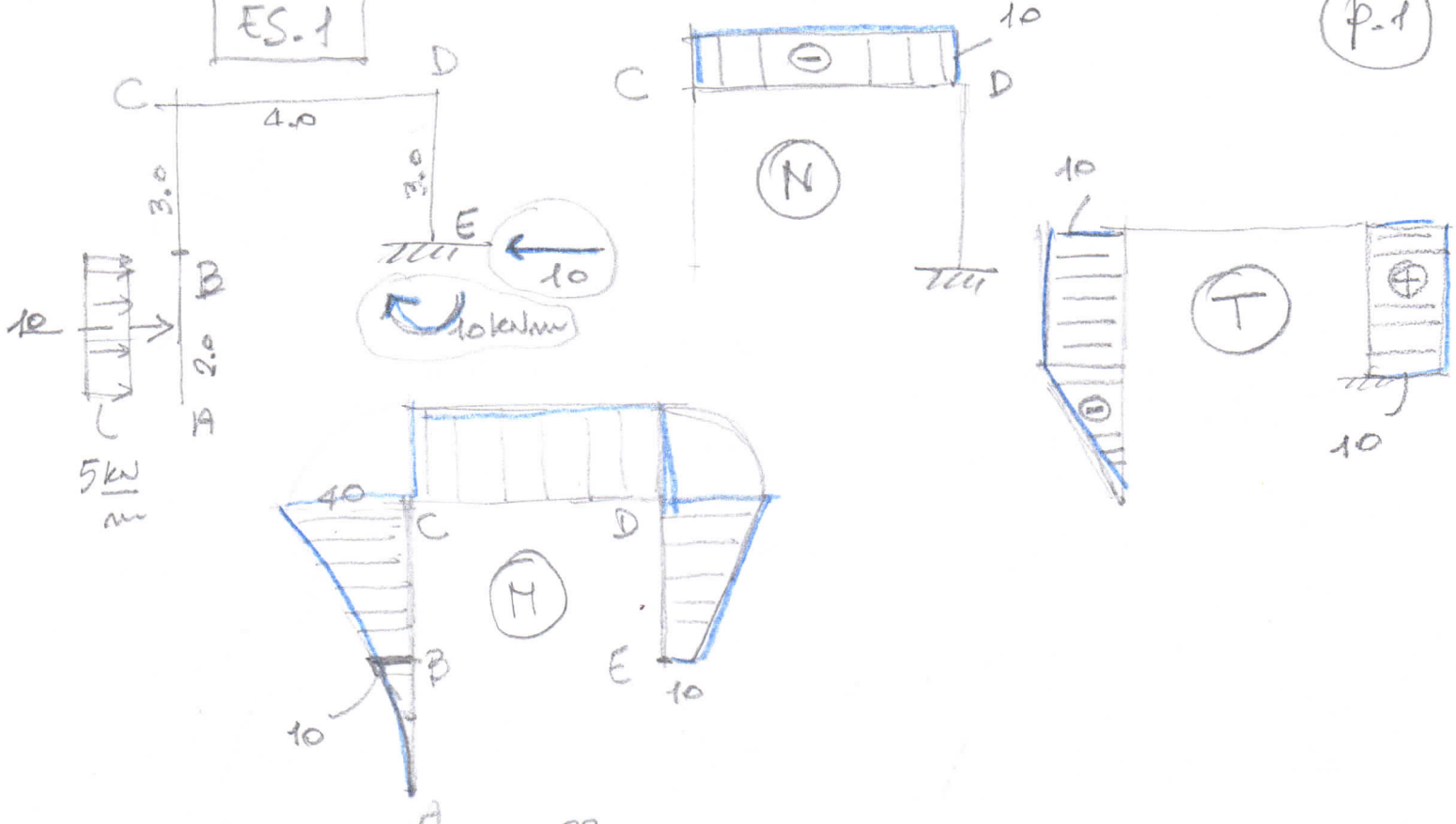


ES. 1

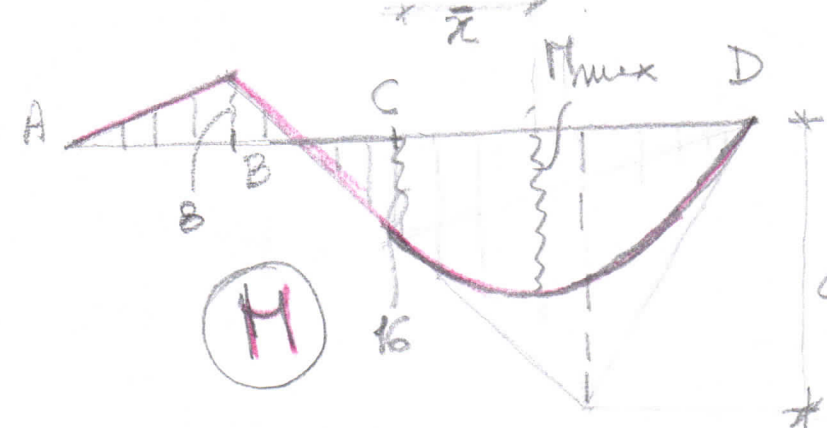
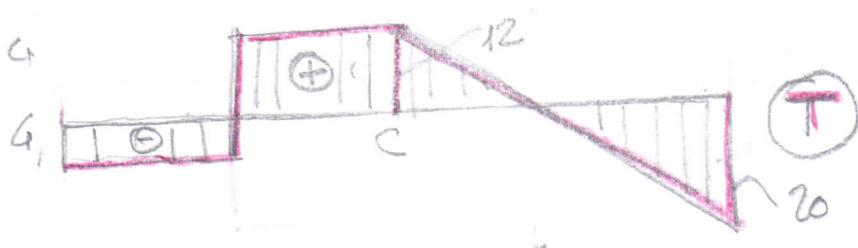
(p. 1)



$$20 = 8 \bar{y} \Rightarrow \bar{y} = 2.5$$

opposite

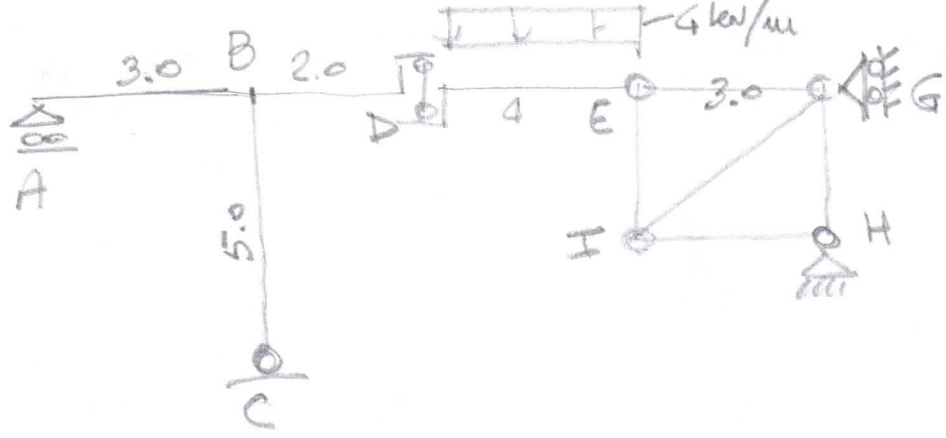
$$12 = 8 \bar{x} \Rightarrow \bar{x} = 1.5$$



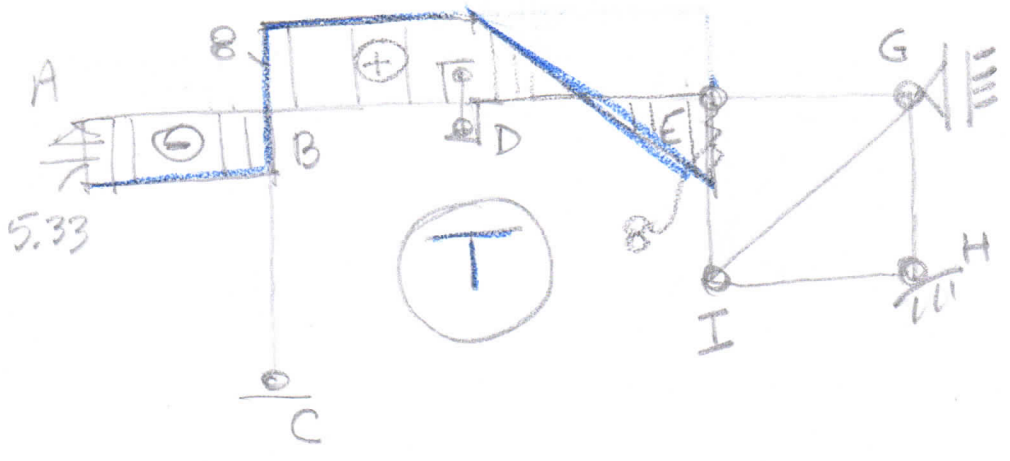
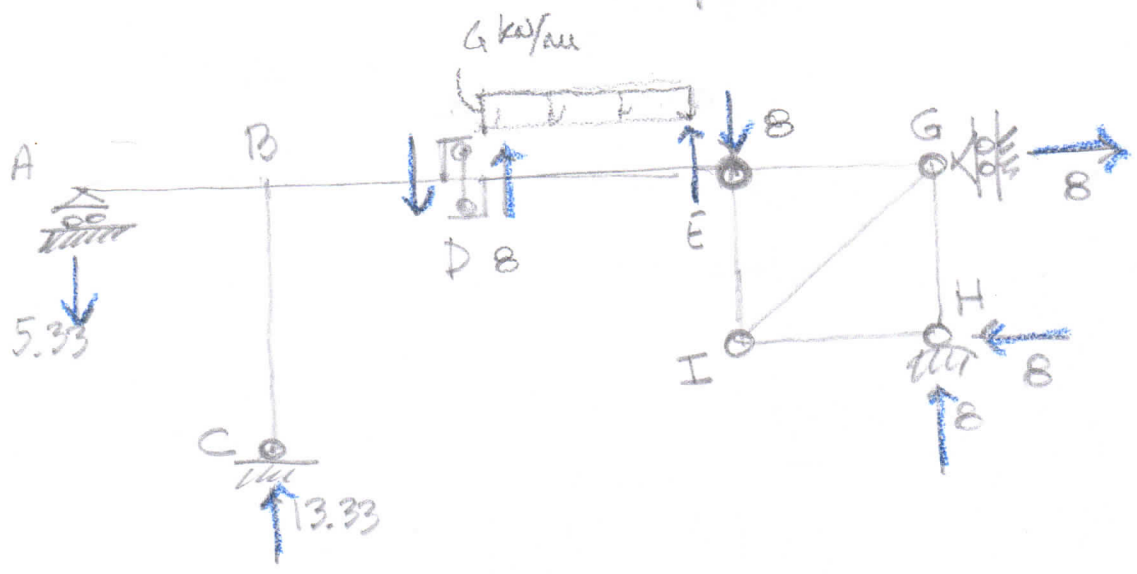
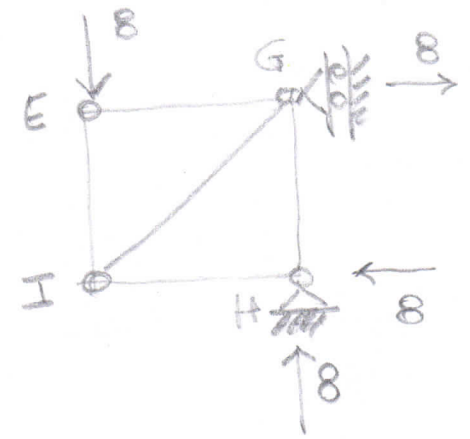
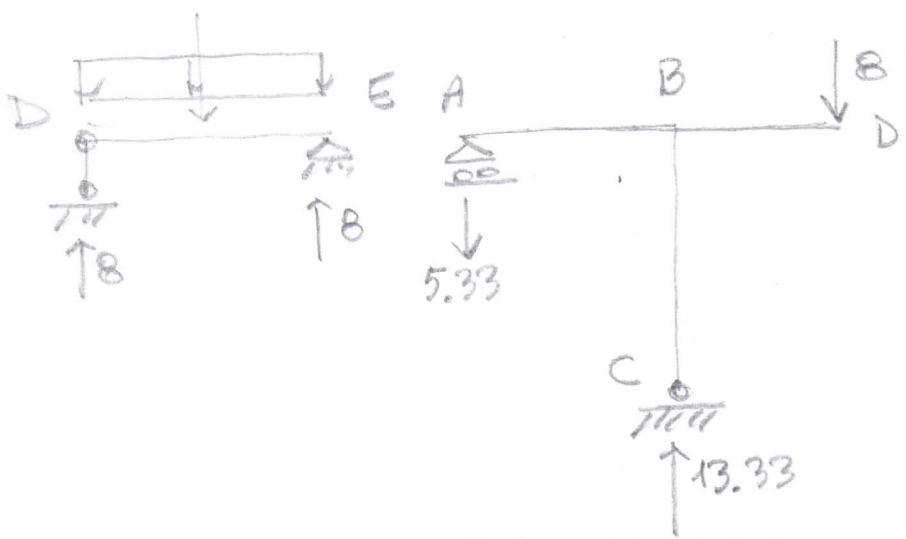
$$M_{max} = 20 \cdot \frac{2.5}{2} = 25 \text{ kNm}$$

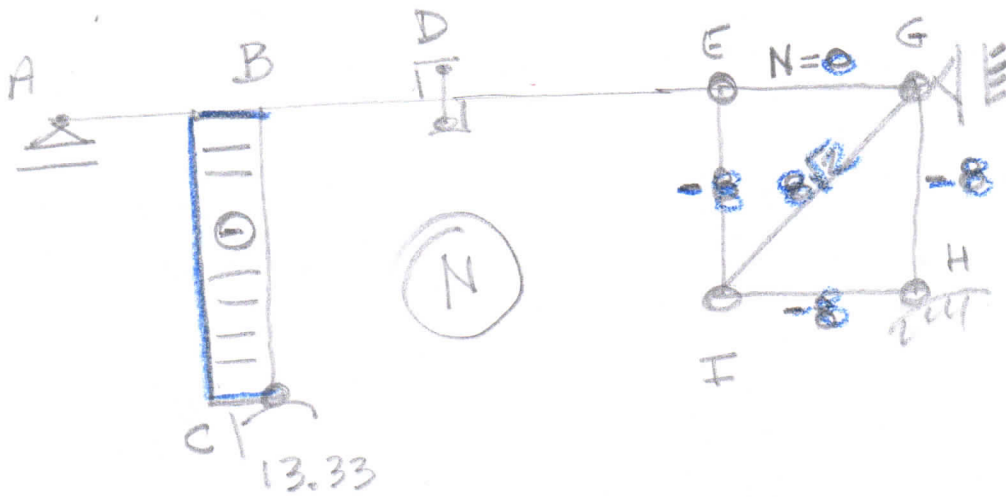
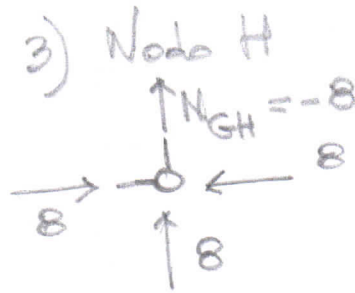
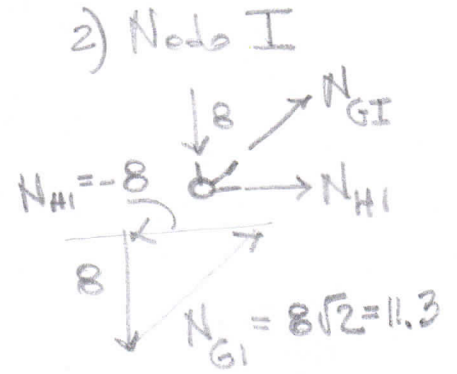
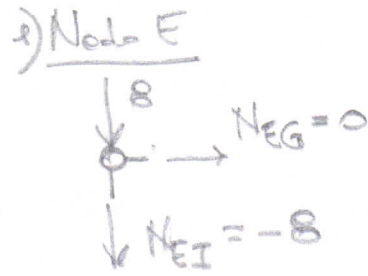
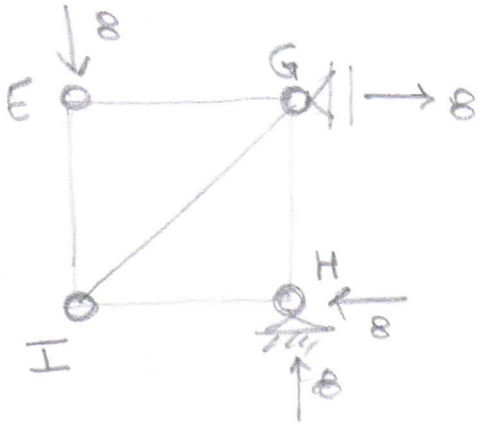
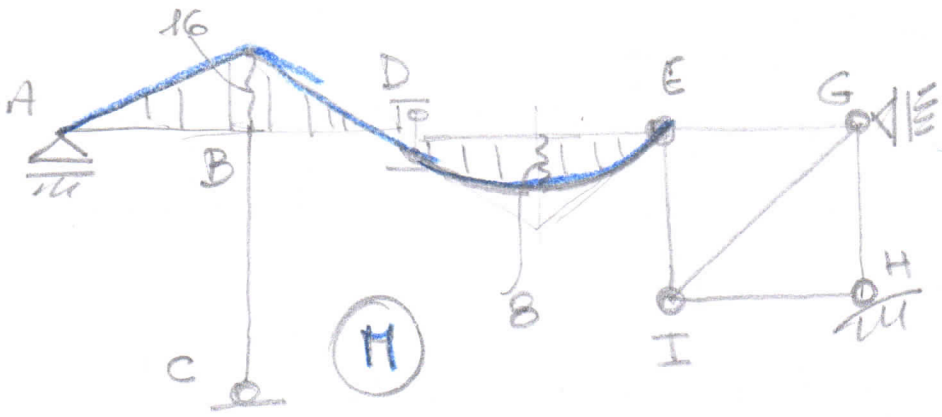
opposite

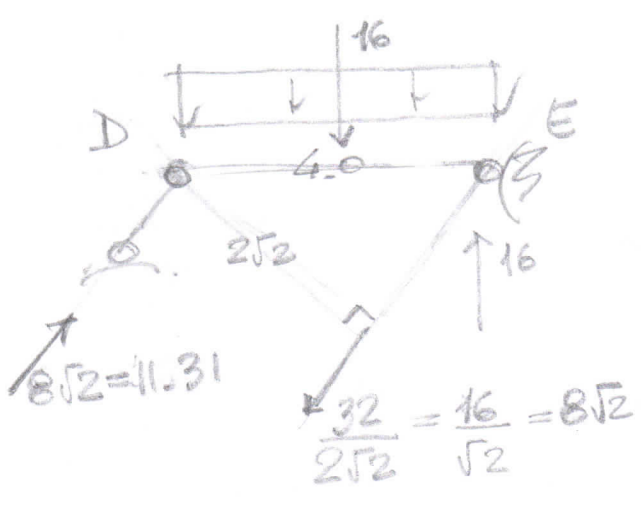
$$40 = M_{max} =$$



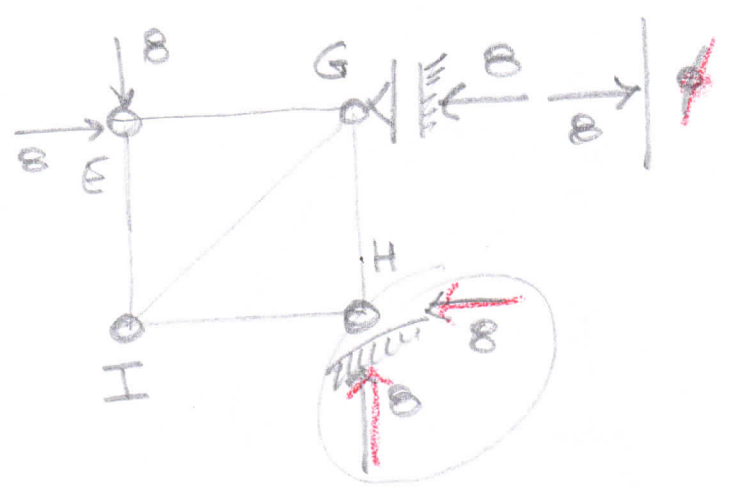
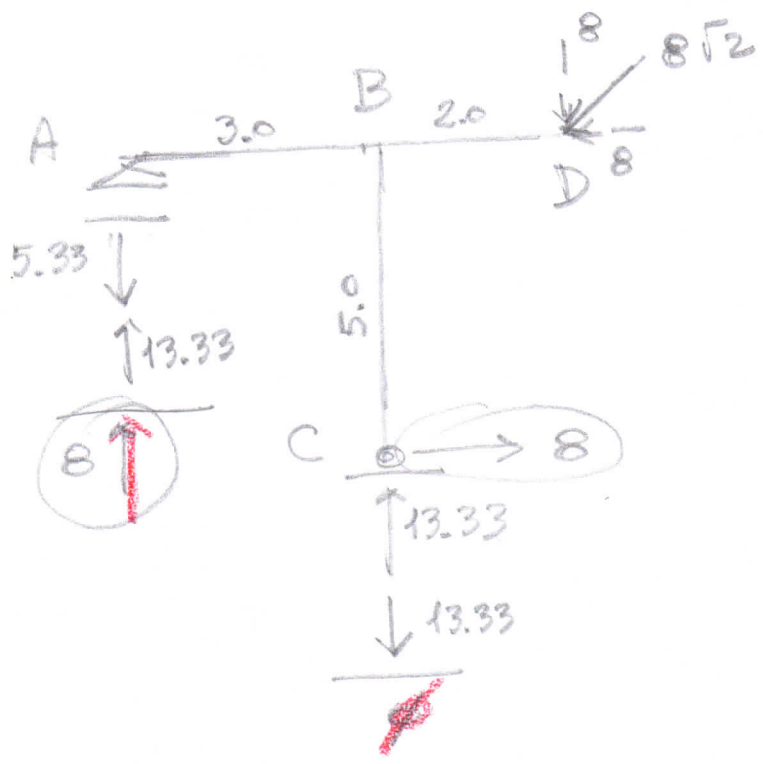
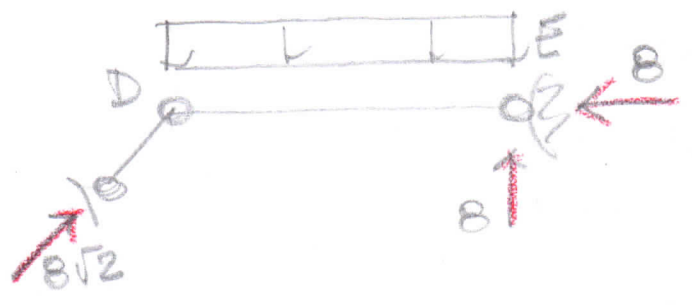
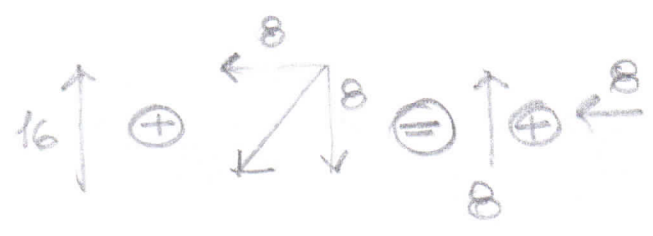
ES.2





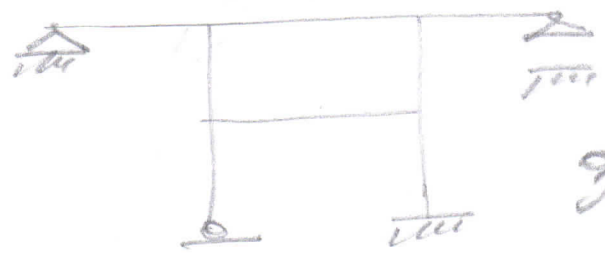


\Rightarrow

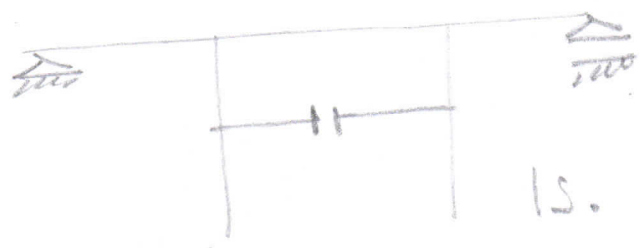


ES.3

φ.5

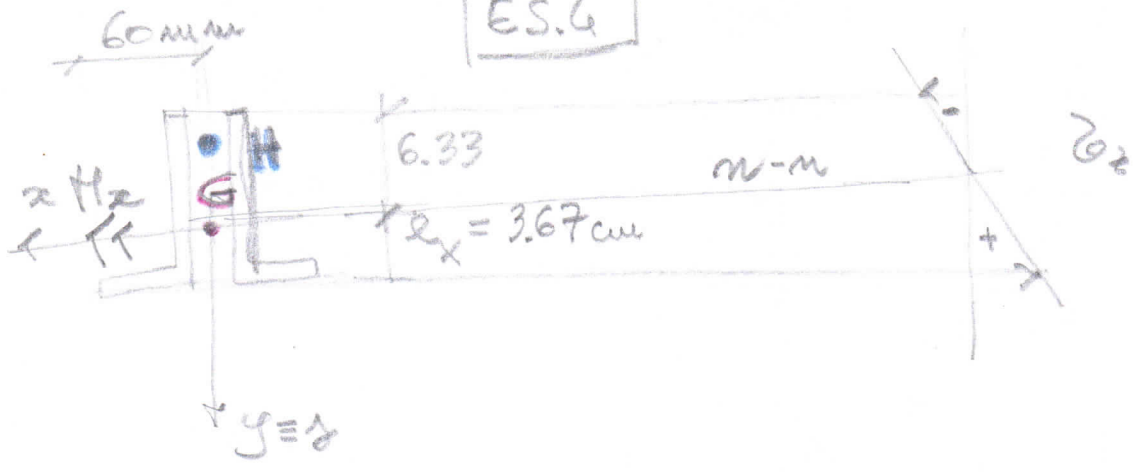


3 ip. int + 5 ip. ext



15.

ES.4



$$I_x = 2 \times 141 = 282 \text{ cm}^4$$

$$I_y = 2 \left[23.4 + 14.1 \times (1.2 + 1)^2 \right] = 183 \text{ cm}^4$$

$$\sigma_z = \frac{12 \cdot 10^6}{282 \cdot 10^4} y = 4.255 y \left[\frac{\text{N}}{\text{mm}^2} \right]$$

$$\sigma_z^{\text{max}} = 4.255 \times 36.7 = 156 \frac{\text{N}}{\text{mm}^2} \quad \sigma_z = 4.255 \times (-100 + 36.7) = -269$$

pto naccio H

$$3.67 \times d_{GH} = \frac{282}{14.1 \times 2} \Rightarrow d_{GH} = 2.7 \text{ cm} \quad d_{GL} = \frac{183}{14.1 \times 2 \times 6} = 1.1$$

$$d_{GH}' = \frac{282}{28.2 \times 6.33} = 1.58$$