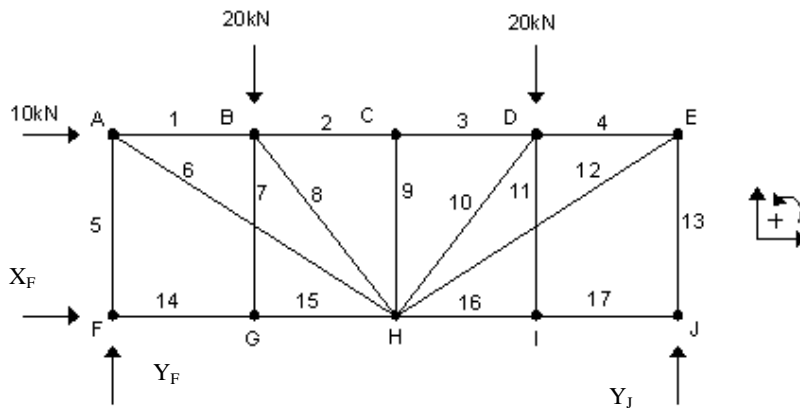


NºUSP: \_\_\_\_\_ Nome: \_\_\_\_\_

**Questão 2 (3,0)**

Na treliça plana da figura, os nós são *A, B, C, D, E, F, G, H, I* e *J*. A força horizontal de *10 kN* está aplicada em *A* e as forças verticais de *20 kN* estão aplicadas em *B* e *D*. Determine:

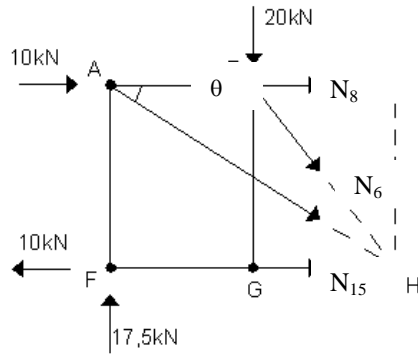
- as reações nos apoios;
- o esforço normal na barra *BC*, aplicando o método de Ritter (das seções);
- os esforços nas barras *AH* e *BG*.



**Resposta:**

- $\sum X = 0 = 10 + X_F \Rightarrow X_F = -10kN \quad (0,5)$
- $\sum M_F = 0 = -10 \cdot 2 - 20 \cdot 2 - 20 \cdot 6 + Y_J \cdot 6 \Rightarrow Y_J = 22,5kN \quad (0,5)$
- $\sum Y = 0 = Y_F - 20 - 20 + Y_J \Rightarrow Y_F = 17,5kN \quad (0,5)$

4) Ritter

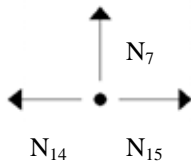


$$\text{sen } \theta = \frac{2}{2\sqrt{5}} = \frac{1}{\sqrt{5}}$$

$$\sum M_H = 0 = -10 \cdot 2 + 20 \cdot 2 - 17,5 \cdot 4 - N_2 \cdot 2$$

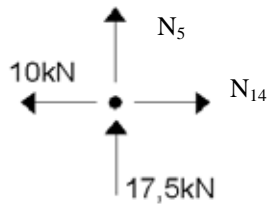
$$\Rightarrow N_2 = -25 \text{ kN} \quad (1,0)$$

5) nó G:



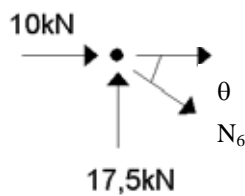
$$\sum Y = 0 = N_7 \quad (0,5)$$

6) nó F:



$$\sum Y = 0 = N_5 + 17,5 \Rightarrow N_5 = -17,5 \text{ kN}$$

7) nó A:



$$\sum Y = 0 = 17,5 - N_6 \cdot \text{sen } \theta$$

$$\Rightarrow N_6 = 17,5 \cdot \sqrt{5} \cong 39,13 \text{ kN} \quad (0,5)$$

