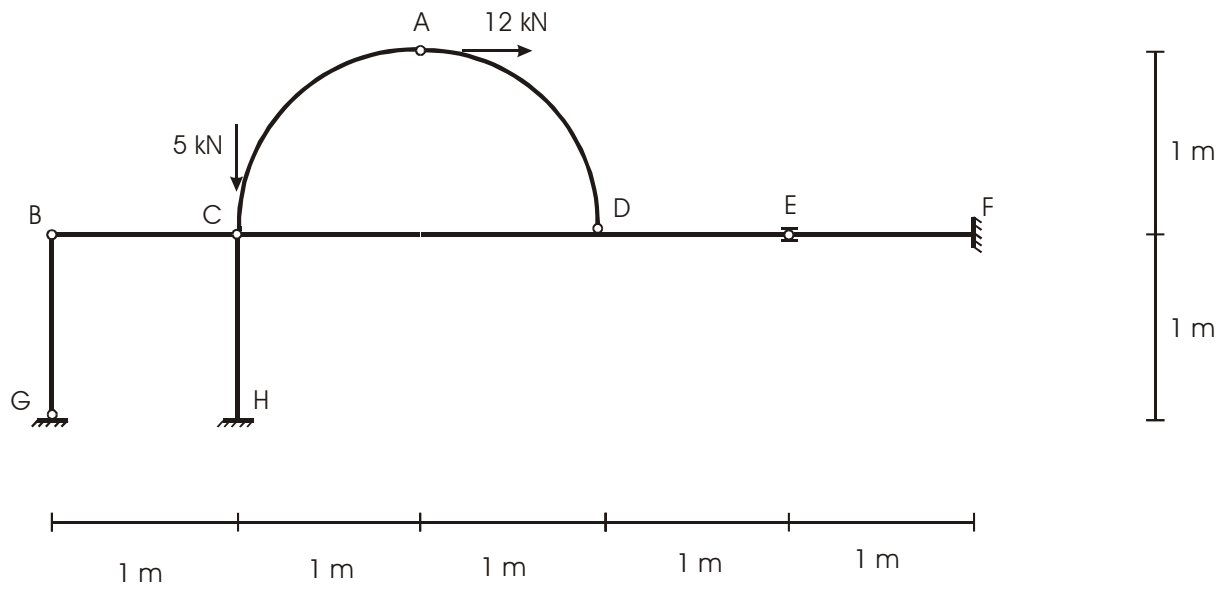


Nº USP: \_\_\_\_\_ Nome: \_\_\_\_\_

**3ª Questão (3,5 pontos)**

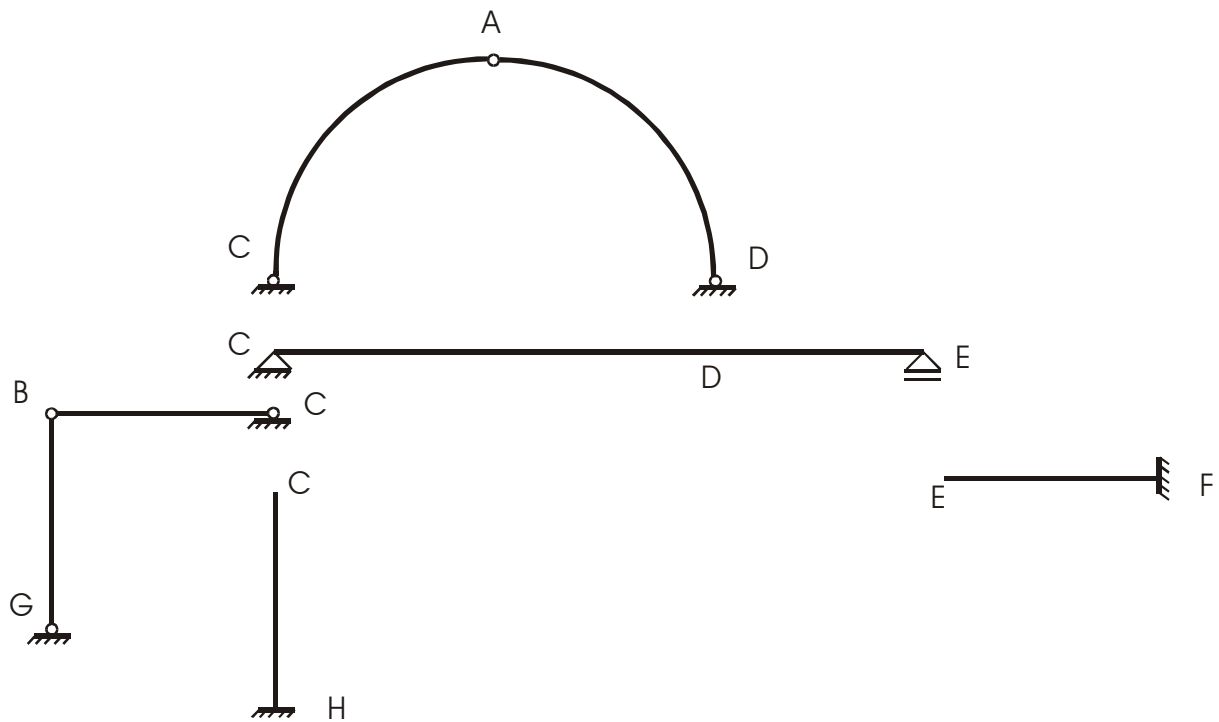
Para a estrutura associada da figura, determinar:

- As subestruturas que a compõem;
- As reações de cada uma destas subestruturas.



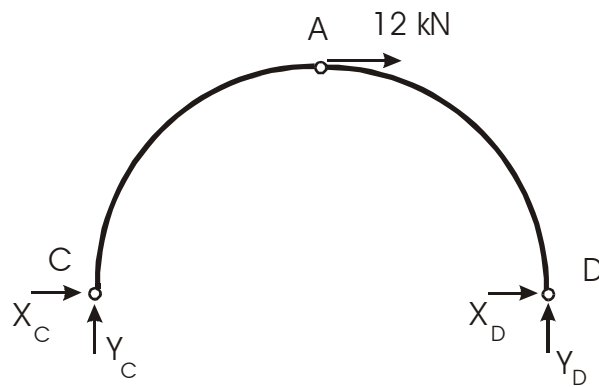
Solução:

a)



b)

1)

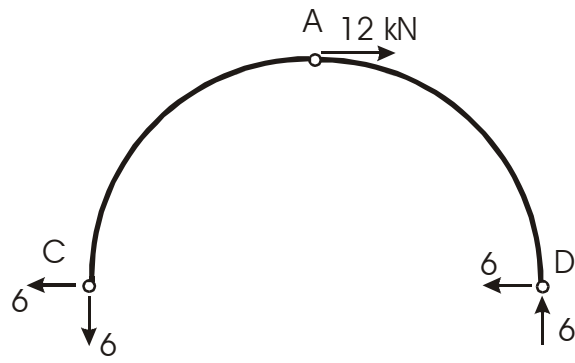


$$\sum M_{(C)} = 0 \quad -12 \cdot 1 + Y_D \cdot 2 = 0 \quad Y_D = 6 \text{ kN}$$

$$\sum Y = 0 \quad Y_C + Y_D = 0 \quad Y_C = -6 \text{ kN}$$

$$M_{\text{fletor em A}} = 0 \quad X_D \cdot 1 + Y_D \cdot 1 = 0 \quad X_D = -6 \text{ kN}$$

$$\sum X = 0 \quad X_C + X_D + 12 = 0 \quad X_C = -6 \text{ kN}$$



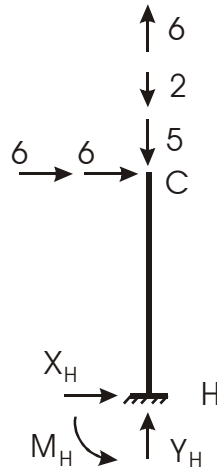
2)



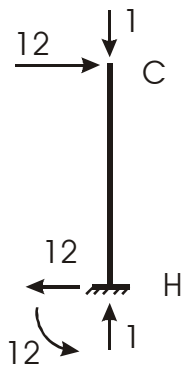
$$\begin{aligned} \sum M_{(E)} = 0 & \quad -Y'_C \cdot 3 + 6 \cdot 1 = 0 & \quad Y'_C = 2 \text{ kN} \\ \sum X = 0 & \quad X'_C + 6 = 0 & \quad X'_C = -6 \text{ kN} \\ \sum Y = 0 & \quad Y'_C - 6 + Y_E = 0 & \quad Y_E = 4 \text{ kN} \end{aligned}$$



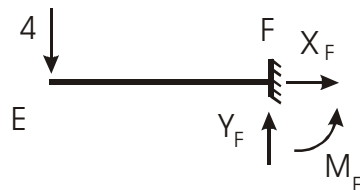
3)



$$\begin{array}{lll} \sum X = 0 & X_H + 6 + 6 = 0 & X_H = -12 \text{ kN} \\ \sum Y = 0 & Y_H - 5 - 2 + 6 = 0 & Y_H = 1 \text{ kN} \\ \sum M_{(H)} = 0 & M_H - 6 \cdot 1 \cdot 2 = 0 & M_H = 12 \text{ kNm} \end{array}$$



4)



$$\begin{array}{lll} \sum X = 0 & X_F = 0 & \\ \sum Y = 0 & -4 + Y_F = 0 & Y_F = 4 \text{ kN} \\ \sum M_{(F)} = 0 & 4 \cdot 1 + M_F = 0 & M_F = -4 \text{ kNm} \end{array}$$

