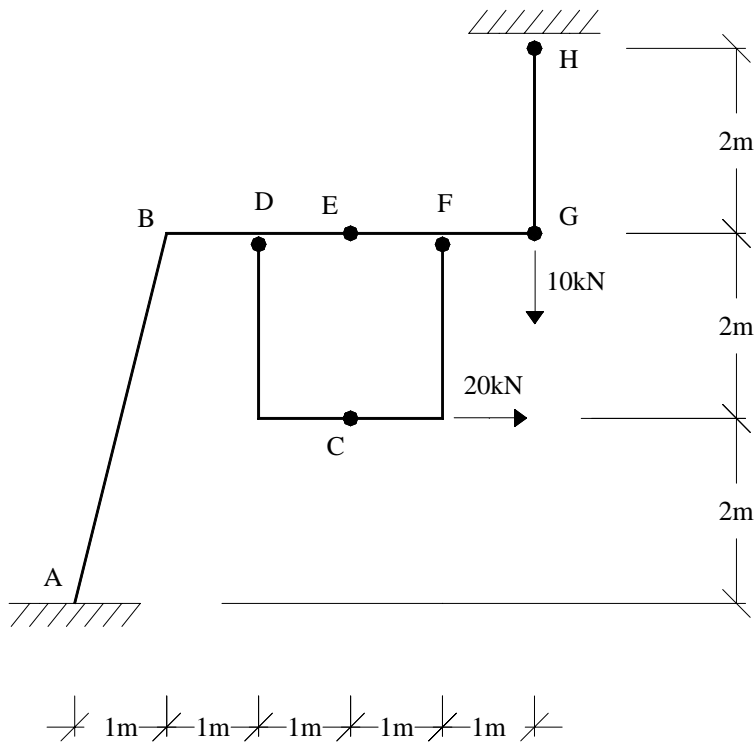


Nº USP: \_\_\_\_\_ Nome: \_\_\_\_\_

**Questão 3 (3,5)**

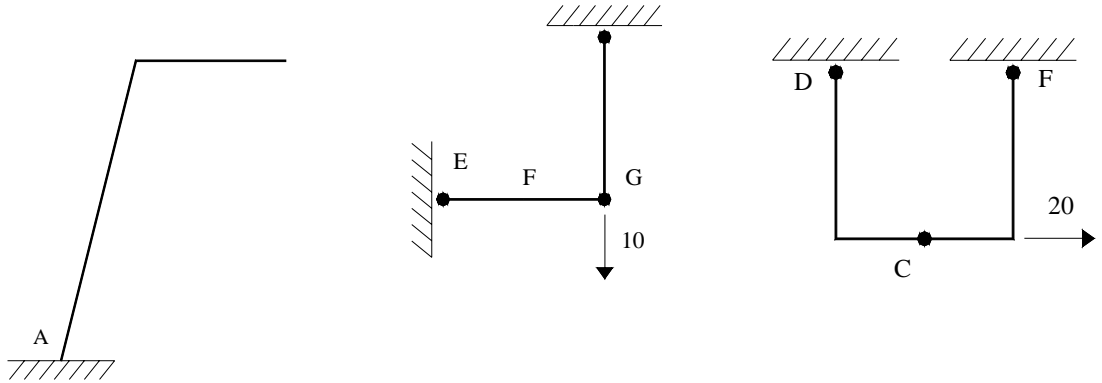
Na estrutura associada da figura, determine:

- a) as subestruturas;
- b) as reações em A;
- c) o diagrama do momento fletor no trecho *EFGH*.



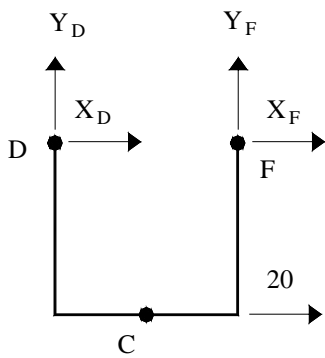
**Resposta:**

a) (1,0)



b)

1)

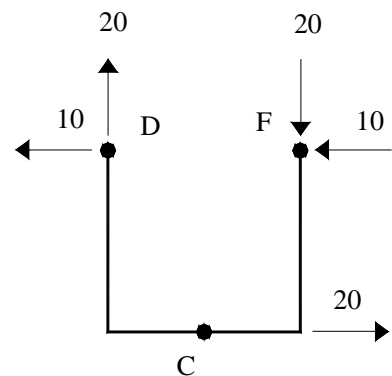


$$\sum M_D = 0 = Y_F \cdot 2 + 20 \cdot 2 \Rightarrow Y_F = -20 \text{ kN}$$

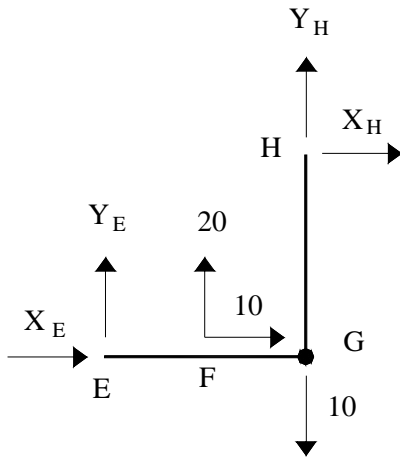
$$\sum Y = 0 = Y_D + Y_F \Rightarrow Y_D = 20 \text{ kN}$$

$$M_C = 0 = Y_F \cdot 1 - X_F \cdot 2 \Rightarrow X_F = -10 \text{ kN}$$

$$\sum X = 0 = X_D + X_F + 20 \Rightarrow X_D = -10 \text{ kN}$$



2)

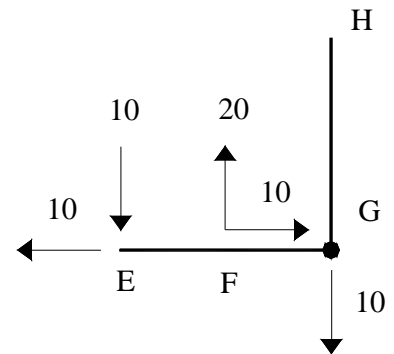


$$M_G = 0 = X_H$$

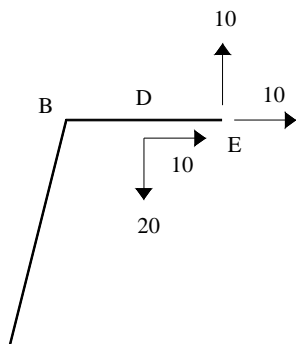
$$\sum X = 0 = X_E + 10 + X_H \Rightarrow X_E = -10 \text{ kN}$$

$$\sum M_E = 0 = 20 \cdot 1 - 10 \cdot 2 + Y_H \cdot 2 - X_H \cdot 2 \Rightarrow Y_H = 0$$

$$\sum Y = 0 = Y_E + 20 - 10 + Y_H \Rightarrow Y_E = -10 \text{ kN}$$



3)



$$\sum X = 0 = Y_A + 10 + 10 \Rightarrow X_A = -20kN$$

$$\sum Y = 0 = Y_A + 10 - 20 \Rightarrow Y_A = 10kN$$

$$\sum M_A = 0 = -20 \cdot 2 - 10 \cdot 4 - 10 \cdot 4 + 10 \cdot 3 + M_A \Rightarrow M_A = 90kN$$

c)(1,0)

