

**PEF 2201 – RESISTÊNCIA DOS MATERIAIS E ESTÁTICA DAS  
CONSTRUÇÕES I**

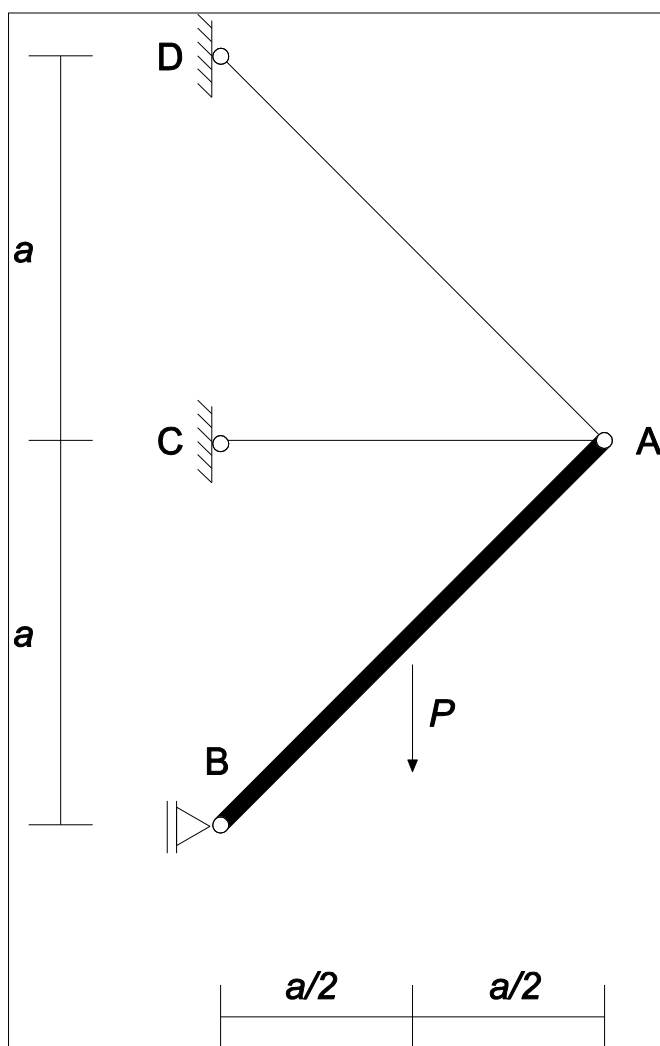
1ª PROVA – 31/8/2012

Nome: \_\_\_\_\_ n° USP: \_\_\_\_\_

**1ª Questão (3,0):**

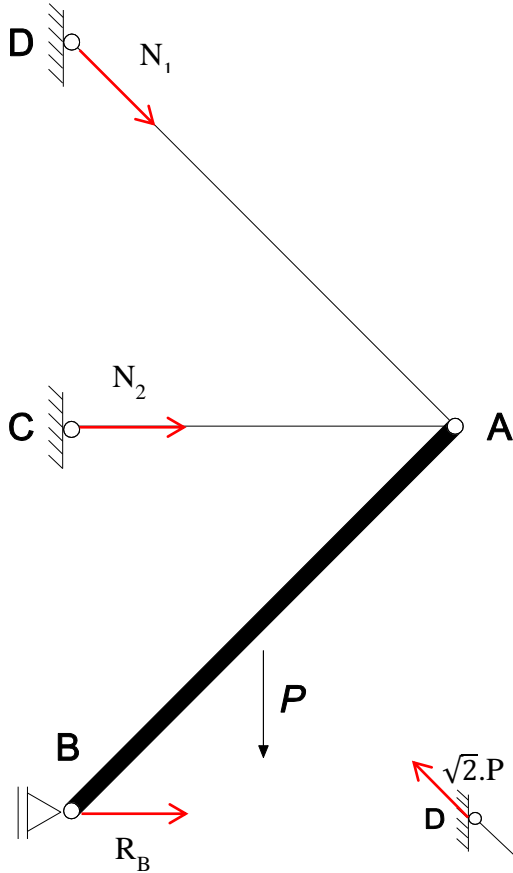
Na estrutura da figura, a barra AB é rígida; as barras AC e AD têm rigidez  $EA$ .

Determinar as componentes vertical e horizontal do deslocamento dos pontos A e B.

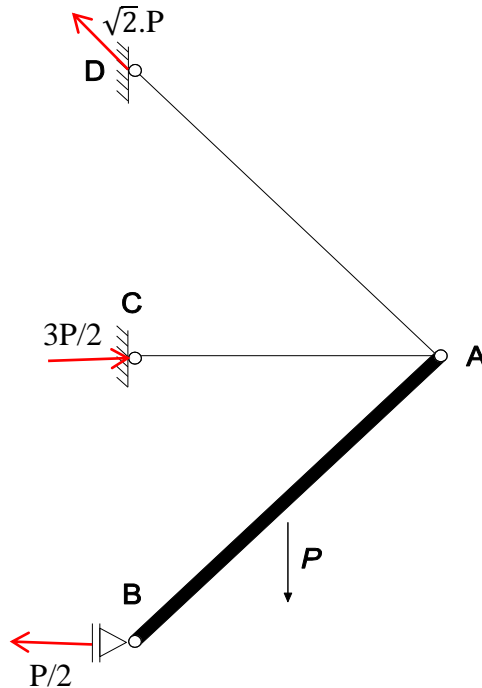


Resolução:

Equilíbrio:

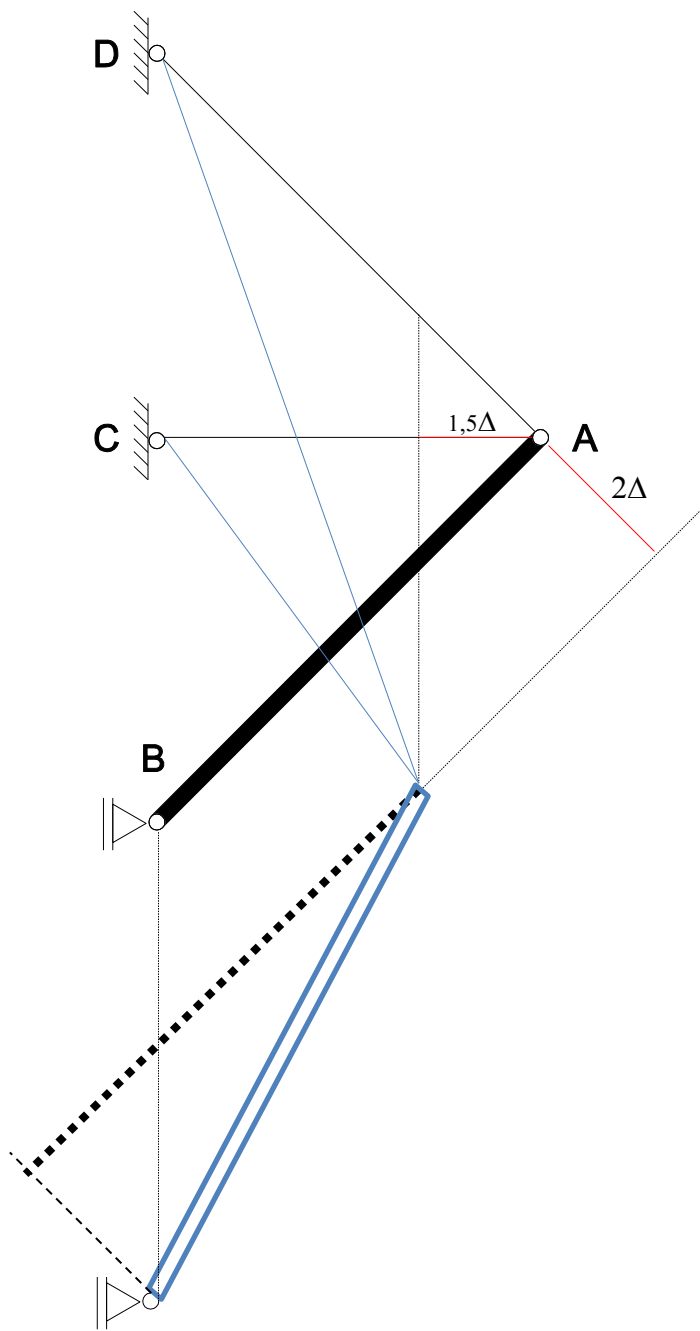


$$\left\{ \begin{array}{l} \sum M_B = 0 = N_1(\sqrt{2} \cdot a) + N_2 \cdot a + P \cdot \frac{a}{2} \\ \sum F_Y = 0 = -N_1 \frac{\sqrt{2}}{2} - P \\ \sum F_X = 0 = R_B + \frac{\sqrt{2}}{2} \cdot N_1 + N_2 \\ N_1 = -P \sqrt{2} \\ N_2 = \frac{3}{2} \cdot P \\ R_B = -\frac{P}{2} \end{array} \right.$$



$$\Delta L_1 = \frac{P\sqrt{2} \cdot a\sqrt{2}}{EA} = \frac{2Pa}{EA} = 2\Delta$$

$$\Delta L_2 = \frac{-3P \cdot a}{2EA} = -\frac{3}{2}\Delta$$



$$u_A = \frac{3}{2}\Delta = \frac{3Pa}{2EA} \text{ (para esquerda)}$$

$$v_A = \Delta(1,5 + 2\sqrt{2}) = \frac{(3 + 4\sqrt{2}) Pa}{2 EA} \text{ (para baixo)}$$

$$u_B = 0$$

$$v_B = \Delta(3 + 2\sqrt{2}) = (3 + 2\sqrt{2}) \frac{Pa}{EA} \text{ (para baixo)}$$