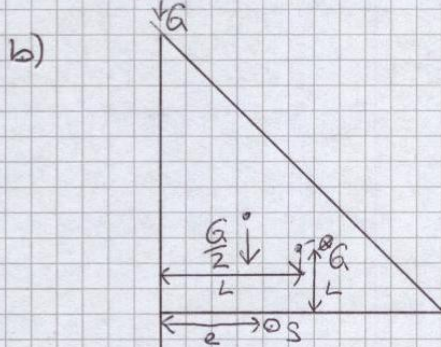


# Lösungen (ohne Gewähr)

Mechanik 1 Klausur 2 2010

1a)  $\underline{W} = \frac{3L \cdot 2L}{2} (-p_0) \underline{e}_x = \underline{-3L^2 p_0 \underline{e}_x}$

Angriff im Flächenschwerpunkt D



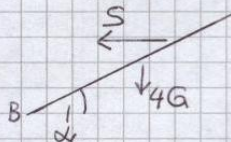
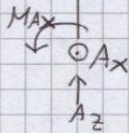
$$\Sigma F_x = 0: S - G + A_x = 0 \Rightarrow \underline{A_x = -G}$$

$$\Sigma F_z = 0: A_z - \frac{3}{2} G = 0 \Rightarrow \underline{A_z = \frac{3}{2} G}$$

$$M_{Ax} = \frac{2}{3} L \frac{G}{2} = \underline{\underline{\frac{LG}{3}}}$$

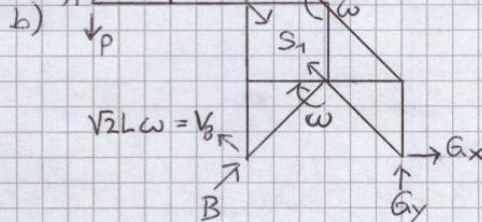
$$M_{Ay} = 0: L \cdot S = 2LG \Rightarrow \underline{S = 2G}$$

$$M_{Az} = 0: LG - e \cdot S = 0 \Rightarrow \underline{e = \frac{L}{2}}$$



$$M_{By} = 0: 4G \cdot L \cdot \cos \alpha = 2G \cdot L$$

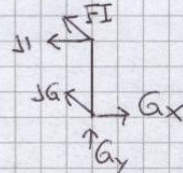
$$\Rightarrow \cos \alpha = \frac{1}{2} \Rightarrow \underline{\alpha = 60^\circ}$$



$$\Sigma F_x = 0: G_x + \frac{\sqrt{2}}{2} B = 0 \Rightarrow \underline{G_x = -2P}$$

$$\Sigma F_y = 0: G_y + \frac{\sqrt{2}}{2} B - P = 0 \Rightarrow \underline{G_y = -P}$$

$$M_G = 0: 4LP - \sqrt{2}LB = 0 \Rightarrow \underline{B = \frac{4}{\sqrt{2}} P = 2\sqrt{2}P}$$



$$M_z = 0: \frac{\sqrt{2}}{2} JG = G_x$$

$$\Rightarrow \underline{JG = -2\sqrt{2}P}$$

$$\Sigma F_y = 0: G_y + \frac{JG}{\sqrt{2}} + \frac{FI}{\sqrt{2}} = 0$$

$$\Rightarrow FI = \sqrt{2}(P + 2P) = \underline{3\sqrt{2}P}$$

$$\Sigma F_x = 0: G_x - \frac{JG}{\sqrt{2}} - \frac{FI}{\sqrt{2}} - JI = 0$$

$$\Rightarrow \underline{JI = -2P + 2P - 3P = -3P}$$

$$\underline{V_I = 0} ; \underline{V_D} = \begin{pmatrix} 0 \\ Lw \end{pmatrix} ; \underline{V_A} = \begin{pmatrix} 0 \\ 3Lw \end{pmatrix}$$

$$P_{tot} = P_D + P_A = -\frac{S_1 \cdot wL}{\sqrt{2}} - 3LwP \stackrel{!}{=} 0$$

$$\Rightarrow \underline{S_1 = -3\sqrt{2}P}$$

c)  $P_{tot} \stackrel{!}{=} 0 = -\frac{S_1 \cdot wL}{\sqrt{2}} - 3LwP - M \cdot w$

$$\Rightarrow \underline{M = -3LP}$$