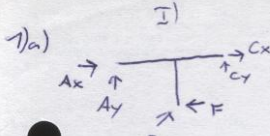
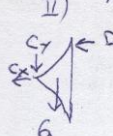
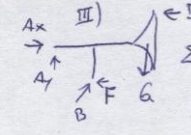


# Lösungen (ohne Gewähr)

Prüfung 2 Mech 1 2008

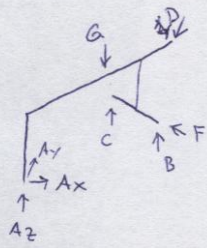
1) a) I)  II)   $M_{CI}: 2L \cdot A_y + FL = 0 \rightarrow A_y = -\frac{F}{2}$   
 $M_{CI}: \frac{3}{2}LD = x_1 \cdot G \rightarrow D = \frac{2}{3} \frac{x_1}{L} G$

III)   $\sum F_x: A_x + \frac{\sqrt{2}}{2}B = D \rightarrow A_x = \frac{2}{3} \frac{x_1}{L} G - G - \frac{F}{2} = G \left( \frac{2}{3} \frac{x_1}{L} - 1 \right) + \frac{F}{2}$   
 $\sum F_y: A_y + \frac{B}{\sqrt{2}} = G \rightarrow B = \left( G + \frac{F}{2} \right) \sqrt{2}$

b)  $\frac{\int_0^L x \cdot z(x) dx}{\int_0^L z(x) dx} = \frac{\int_0^L \frac{x^3}{L} + \frac{x^2}{2} dx}{\int_0^L \frac{x^2}{L} + \frac{x}{2} dx} = \frac{\left[ \frac{x^4}{4L} + \frac{x^3}{6} \right]_0^L}{\left[ \frac{x^3}{3L} + \frac{x^2}{4} \right]_0^L} = \frac{\frac{L^3}{4} + \frac{L^3}{6}}{\frac{L^2}{3} + \frac{L^2}{4}} = \frac{\frac{5L^3}{12}}{\frac{7L^2}{12}} = \frac{5L}{7}$

2 a) - 4 starre Körper;  $P_{tot} = 0$ ;  $P_c = 11 \cdot \sqrt{2} L W$   
 $V_B = 2\sqrt{2} L W \rightarrow P_B = -P 2\sqrt{2} L W$ ;  $P_c = 3P \sqrt{2} L W$ ;  $P_D = 11 \sqrt{2} L W$   
 $P_{tot} = 0 = \sqrt{2} 11 + \sqrt{2} 11 - 2\sqrt{2} P + 3\sqrt{2} P \rightarrow P = -\frac{P}{2} \checkmark$

b)  $2\sqrt{2} 11 L W - M W + \sqrt{2} P L W = 0 \rightarrow M = \sqrt{2} P L \checkmark$

3 a)  ①  $\sum F_x = 0: A_x - \frac{F}{\sqrt{2}} = 0 \rightarrow A_x = \frac{F}{\sqrt{2}} \checkmark$   
 ②  $\sum F_y = 0: A_y + \frac{F}{\sqrt{2}} - D = 0 \rightarrow A_y = \left( \frac{5\sqrt{2}}{6} - \frac{1}{\sqrt{2}} \right) F = \frac{4\sqrt{2}}{3} F = \frac{2\sqrt{2}}{3} F \checkmark$   
 ③  $\sum F_z = 0: A_z - G + C + B = 0$   
 ④  $M_{Ax} = 0 = 5a \cdot F - \frac{6aD}{\sqrt{2}} \rightarrow D = \frac{5\sqrt{2}}{6} F \checkmark$   
 ⑤  $M_{Ax} = 0 = a \cdot D - \frac{4a}{\sqrt{2}} G + B \left( \frac{5a-a}{\sqrt{2}} \right) + \frac{6a}{\sqrt{2}} C \checkmark$   
 ⑥  $M_{Ay} = 0 = \frac{2}{\sqrt{2}} G - \frac{2}{\sqrt{2}} C - \frac{3}{\sqrt{2}} B = 2G - 2C - 3B \rightarrow C = G - \frac{3}{2} B$   
 ⑦ in ⑤:  $0 = \frac{5\sqrt{2}}{6} F - \frac{4a}{\sqrt{2}} G + \frac{4}{\sqrt{2}} B + \frac{6}{\sqrt{2}} G - \frac{a}{\sqrt{2}} B \Rightarrow \frac{5}{\sqrt{2}} B = \frac{5\sqrt{2}}{6} F + \frac{\sqrt{2}G}{\sqrt{2}} \rightarrow B = \frac{F}{3} + \frac{2G}{5} \checkmark$   
 ③:  $A_z = G - \frac{F}{3} - \frac{2G}{5} - \frac{2}{5} G + \frac{F}{2} = \frac{F}{6} + \frac{G}{10} \checkmark$   
 b)  $C = \frac{2G}{5} - \frac{F}{2} \geq 0 \rightarrow F \leq \frac{4G}{5}$