



MAK104 STATICS
2017-2018 SUMMER
28.05.2018
QUIZ 4 -
SOLUTION

Name Surname:

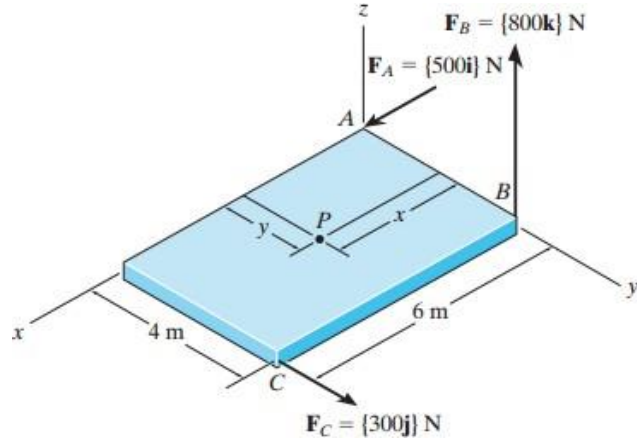
Number:

TOTAL TIME: 15 Minutes

GOOD LUCK

QUESTION: Replace the three forces acting on the plate by a wrench. Specify the magnitude of the force and couple moment for the wrench and the point $P(x, y)$ where its line of action intersects the plate.

Levha üzerine etki eden üç kuvveti bir vida ile değiştiriniz. Vida için kuvveti, moment çiftinin büyüklüğünü ve vidanın hareket çizgisinin $P(x, y)$ plakayla kesiştiği noktayı bulunuz.



F_R (N)	
M_R (kN.m)	
x (m)	
y (m)	

$$F_R = (500i + 300j + 800k) \text{ N}$$

$$F_R = \sqrt{(500)^2 + (300)^2 + (800)^2} = 989.9 \text{ N}$$

$$u_{FR} = \frac{500i + 300j + 800k}{\sqrt{500^2 + 300^2 + 800^2}} = 0.505i + 0.303j + 0.808k$$

$$M_{R_x} = 800 \cdot (4 - y) \quad M_{R_y} = 800x \quad M_{R_z} = 500 \cdot y + 300 \cdot (6 - x)$$

Since M_R also act in the direction of u_{FR} .

$$M_R \cdot (0.505i) = 800 \cdot (4 - y)$$

$$M_R \cdot (0.303j) = 800x$$

$$M_R \cdot (0.808k) = 500y + 300(6 - x)$$

$$\left. \begin{array}{l} M_R = 3.07 \text{ kN} \cdot \text{m} \\ x = 1.16 \text{ m} \\ y = 2.06 \text{ m} \end{array} \right\}$$