TOBB EKONOMİ VE TEKNOLOJİ ÜNİVERSİTESİ

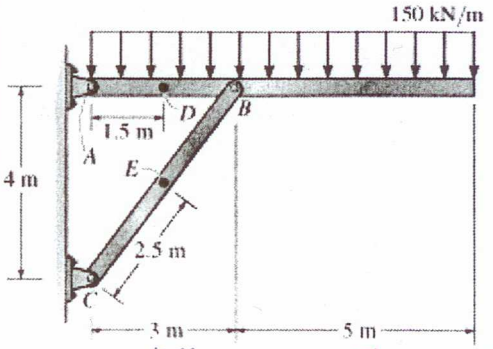
MAK 205 Mukavemet–Yaz 2008 Dönemi

QUIZ 1

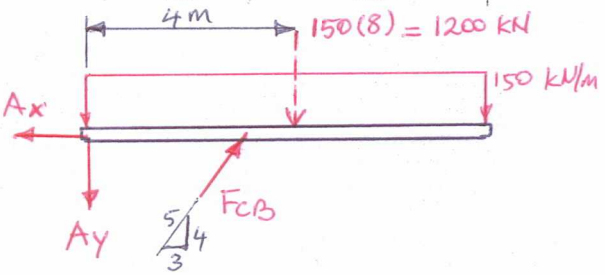
15 Mayıs 2008 Ad, Soyad _____

Dr. M. Ali Güler Öğrenci No. _____

Soru: Şekilde gösterilen dağili yük etkisindeki sistemin *A, B* ve *C*'deki pimlerinin çaplarını bulunuz $\tau_{allow} = 100\,\text{MPa}$, $\sigma_{allow} = 150\,\text{MPa}$. Bütün pimler çift kesme etkisi altındadır.



$\phi_A =$	89.7	mm
$\phi_B =$	113	mm
$\phi_C =$	113	mm



$\curvearrowright \Sigma M_A = 0$: $1200\,(4) - F_{CB}\,\frac{4}{5}.(3) = 0$

$F_{CB} = 2000\ \text{kN}$

$\rightarrow \Sigma F_X = 0$ $\quad F_{CB}\left(\frac{3}{5}\right) - A_x = 0$

$A_x = 2000.\left(\frac{3}{5}\right)$

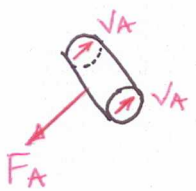
$A_x = 1200\ \text{kN}$

$+\uparrow \Sigma F_Y = 0$ $\quad -1200 + F_{CB}\left(\frac{4}{5}\right) - A_y = 0$

$A_y = 400\ \text{kN}$

For Pin A

$F_A = \sqrt{A_x^2 + A_y^2} = 1264.9111\ \text{kN}$

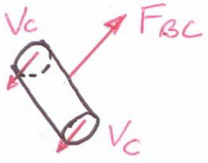


$F_A = 2V_A \Rightarrow V_A = 632.4555\ \text{kN}$

$\tau_{allow} = \dfrac{V_A}{\frac{\pi \phi_A^2}{4}} \Rightarrow \phi_A = \sqrt{\dfrac{4V_A}{\pi \tau_{allow}}} = 0.0897\ \text{m}$

$\phi_A = 89.7\ \text{mm}$

For Pin B and C



$F_{BC} = 2V_C = 2V_B \Rightarrow V_C = 1000\ \text{kN}$

$\phi_B = \phi_C = \sqrt{\dfrac{4V_C}{\pi \tau_{allow}}} = \sqrt{\dfrac{4.(1000)\,\text{kN}}{\pi.(100\,000)\,\text{kPa}}} = 0.1128\ \text{m}$

$\phi_B = \phi_C = 112.8\ \text{mm}$