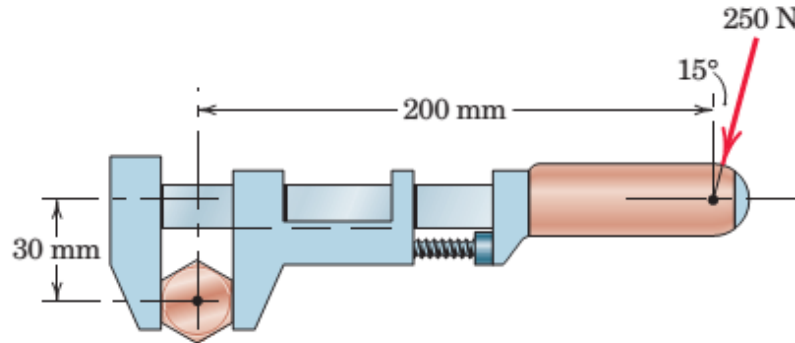


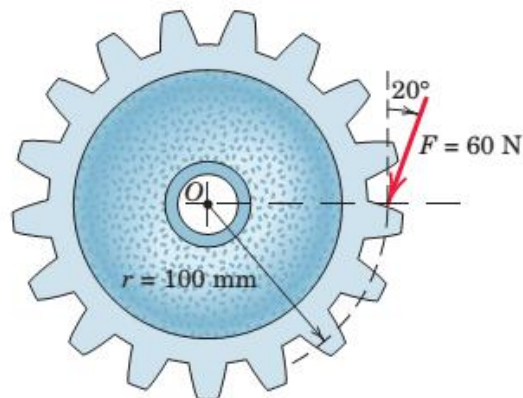
ME 161
Assignment II

Answer questions 4, 6, 8, 11(a), 13, and 15.
(To be submitted in hand-writing on foolscap or A4 by 17:00 GMT on the 14th of November, 2014.)

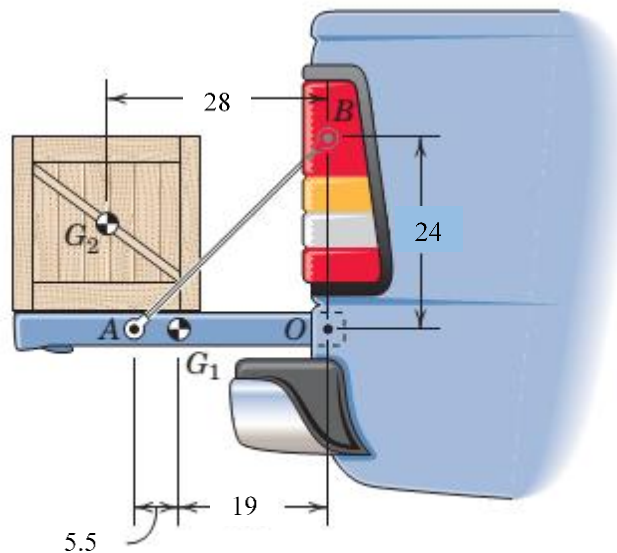
1. Calculate the moment of the 250 N force on the handle of the wrench about the centre of the bolt.



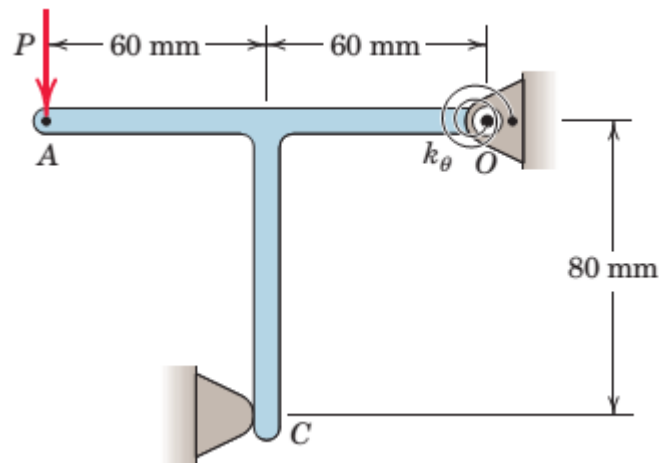
2. A force F of magnitude 60 N is applied to the gear. Determine the moment of F about point O .



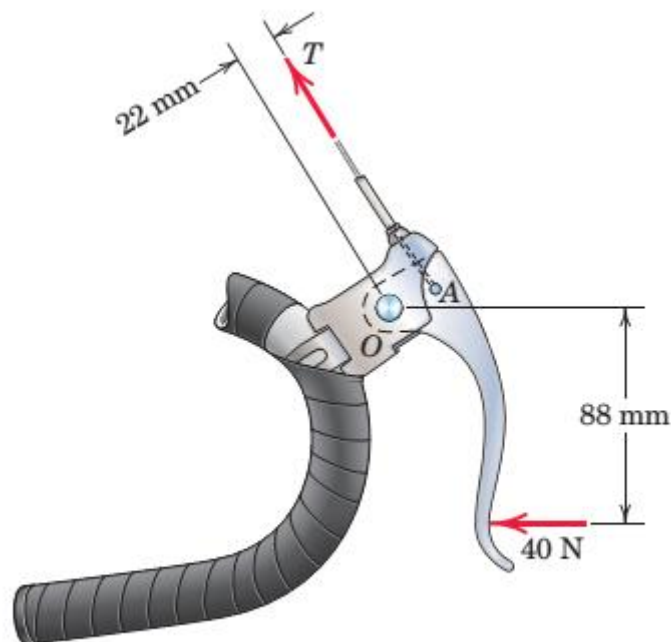
3. A 120 kg crate rests on a 60 kg pickup tailgate as shown. Calculate the Tension T in in each of the restraining tailgate cables, one of which is shown. The centres of gravity are at G_1 and G_2 . The crate is located midway between the two cables. All dimensions are in mm.



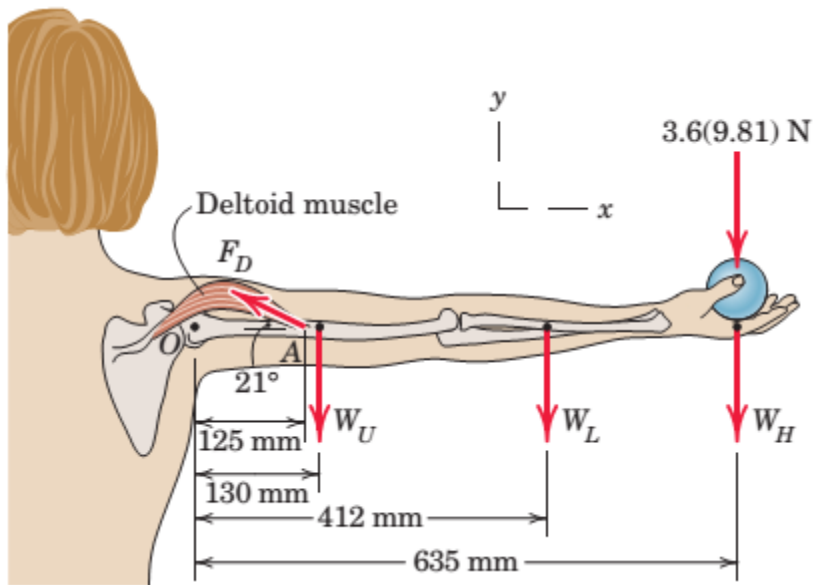
4. When the 0.05 kg body is in the position shown, the torsional spring at O is pretensioned so as to exert a 0.375 Nm clockwise moment on the body. Determine the force P required to break contact at C . Neglect the weight of the body.



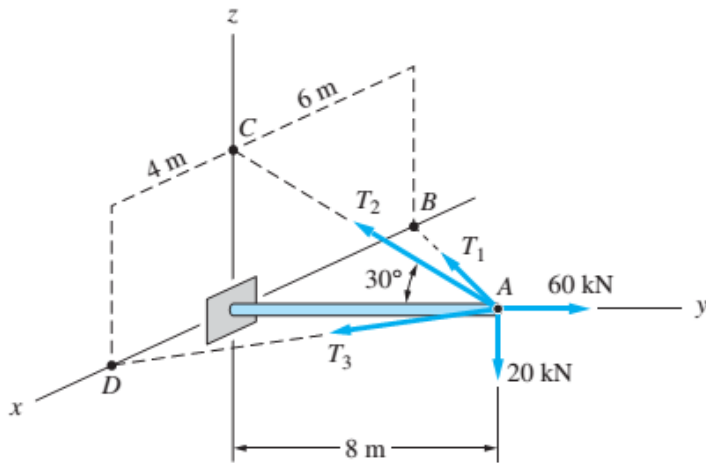
5. A bicyclist applies a 40 N force to the brake lever of her bicycle as shown. Determine the corresponding tension T transmitted to the brake cable. Neglect friction at the pivot O .



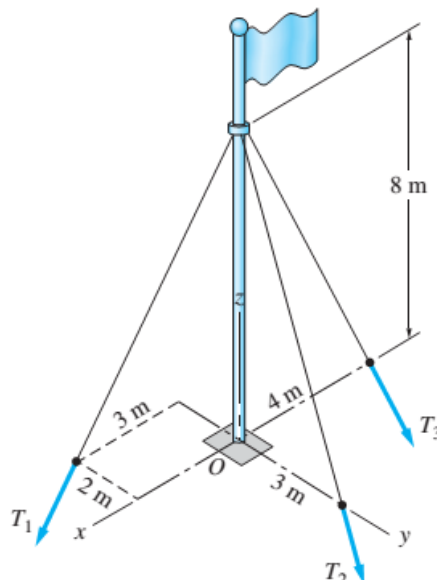
6. A woman is holding a 3.6 kg sphere in her hand with the entire arm held horizontally as shown. A tensile force in the deltoid muscle prevents the arm from rotating about the shoulder joint O ; this force acts at the 21° angle as shown. Determine the force exerted by the deltoid muscle on the upper arm at A , and the x and y components of the force reaction at the shoulder joint O . The mass of the upper arm m_U is 1.9 kg, the mass of the lower arm m_L is 1.1 kg and the mass of the hand m_H is 0.4 kg. All the mentioned weights act at corresponding locations in the figure.



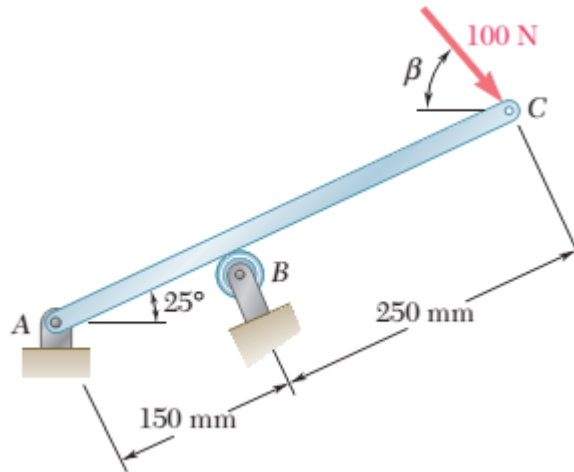
7. The five forces act at end A of the boom. Determine T_1 , T_2 , and T_3 if the resultant of this force system is zero.



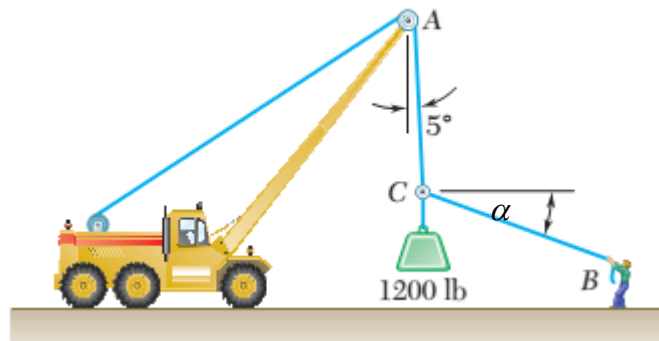
8. The resultant of the three cable tensions acting on the flagpole is the force $R = Rk$. Find T_1 , T_2 , and R given that $T_3 = 500$ N.



9. Determine the reactions at A and B when β is 50° .



10. Knowing that α is 52° , determine the tension in cable AC and rope BC if the 1200 lb weight is in equilibrium.



11. Locate the centroids of the plane figures shown below.

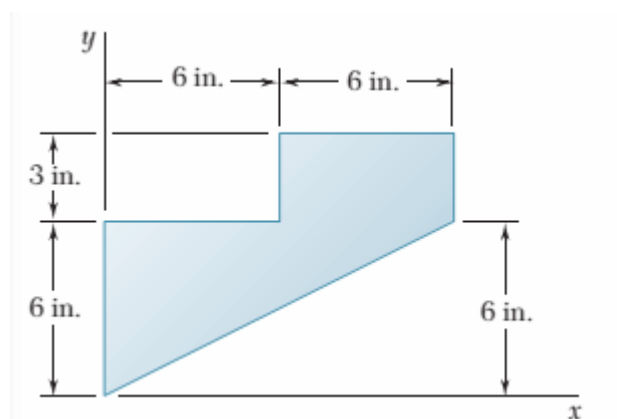


Figure 11 (a)

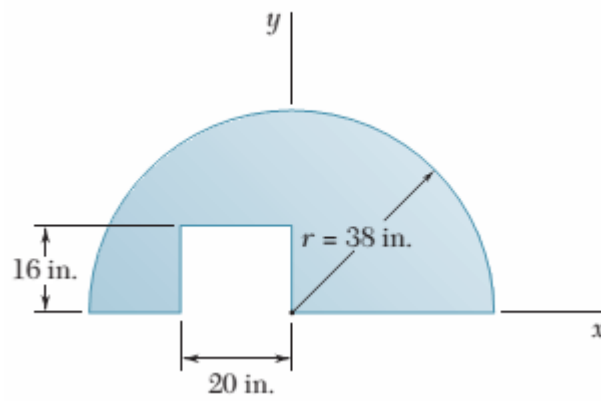


Figure 11 (b)

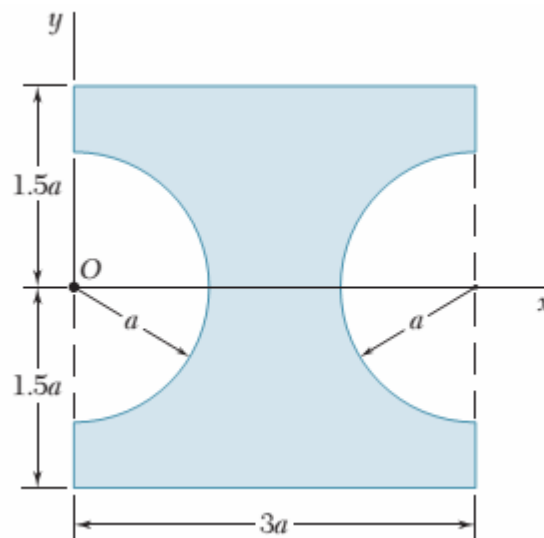
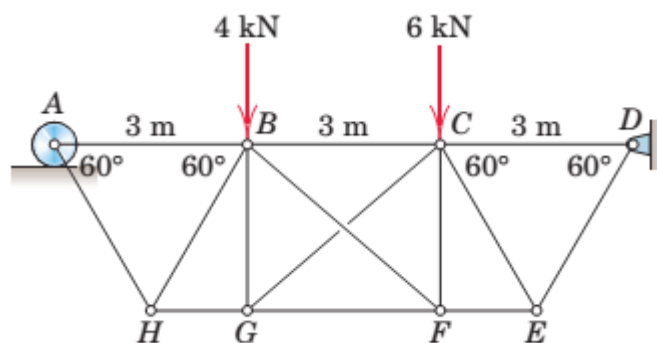
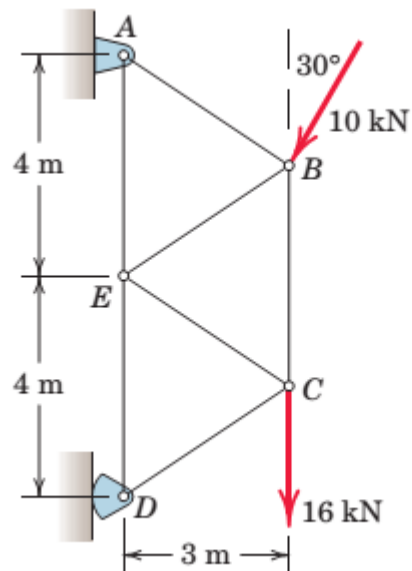


Figure 11 (c)

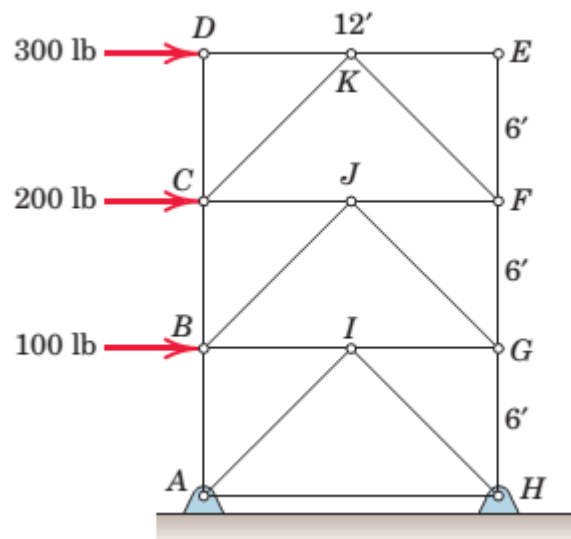
12. Calculate the forces in member AB, BH, and BG. Members BF AND CG are cables which can support tension only.



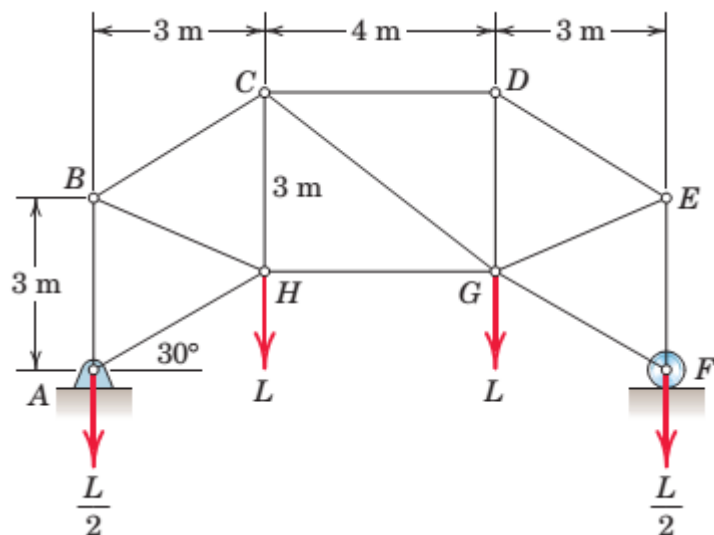
13. Determine the force in each member of the loaded truss shown. All triangles are isosceles.



14. Determine the forces in members BC and FG of the loaded symmetrical truss.



15. Determine the forces in members CG and GH of the loaded truss shown.



16. Determine the forces in members AB , BC , and BD of the loaded truss.

