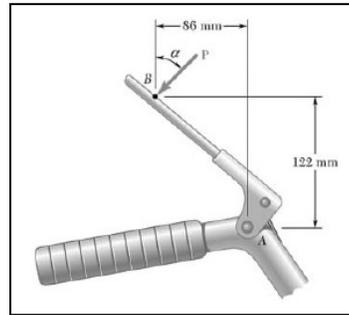


# KMEE 1168 Engineering Mechanics

## Tutorial 2: Particle – Equivalent System of Forces

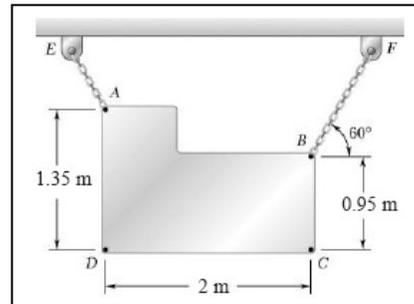
### Question 1 (3-01)

A 13.2-N force  $P$  is applied to the lever which controls the auger of a snowblower. Determine the moment of  $P$  about  $A$  when  $\alpha$  is equal to  $30^\circ$ . (1.788 Nm)



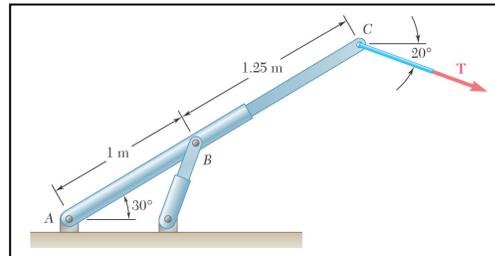
### Question 2(03-07)

A sign is suspended from two chains  $AE$  and  $BF$ . Knowing that the tension in  $BF$  is 200 N, determine  
 (a) The moment about  $A$  of the force exerted by the chain at  $B$   
 (b) The smallest force applied at  $C$  which creates the same moment about  $A$ . (386Nm, 160.1N)



### Question 3 (3-78)

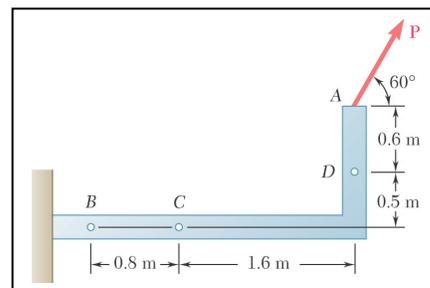
The tension in the cable attached to the end  $C$  of an adjustable boom  $ABC$  is 1000 N. Replace the force exerted by the cable at  $C$  with an equivalent force-couple system  
 (a) at  $A$   
 (b) at  $B$ .



(1000N, 1724Nm, 1000N, 958Nm)

### Question 4 (3-80)

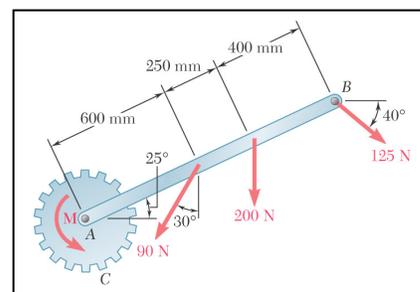
A 700-N force  $P$  is applied at point  $A$  of a structural member. Replace  $P$  with  
 (a) An equivalent force-couple system at  $C$   
 (b) An equivalent system consisting of a vertical force at  $B$  and a second force at  $D$ .



(700N, 585Nm, 87.5N, 626N)

### Question 5 (3-105)

Gear  $C$  is rigidly attached to arm  $AB$ . If the forces and couple shown can be reduced to a single equivalent force at  $A$ , determine the equivalent force and the magnitude of the couple  $M$ . (50.756N, -358.29N, 362N, 327Nm)



**Question 6 (3-150)**

Two parallel 60-N forces are applied to a lever as shown. Determine the moment of the couple formed by the two forces,

- i) By resolving each force into horizontal and vertical components and adding the moments of the two resulting couples,
- ii) By using the perpendicular distance between the two forces,
- iii) By summing the moments of the two forces about point A.

(12.39Nm, 12.39Nm, 12.39Nm)

