Calculating Torque & Angular Acceleration

1. See figure 1. Assume the balance has negligible mass

0cm

10cm

20cm

30cm

40cm

10cm

20cm

30cm

40cm

6kg

m

Fig 1. This system is at rest

* 1. What is the torque created by the 6kg mass?
  2. What must the torque created by the unknown mass be?
  3. Will the unknown mass be larger or smaller than 6kg? How do you know?
  4. What is the unknown mass?

1. See figure 2. Assume the balance has negligible mass.

0cm

10cm

20cm

30cm

40cm

10cm

20cm

30cm

40cm

6kg

m

Fig 2 α = 0.8rad/sec2

* 1. What is the torque created by the 6kg mass?
  2. What must the net torque be?
  3. What must the torque created by the unknown mass be?
  4. What must the unknown mass be?

1. See figure 3. Assume the balance has negligible mass.

0cm

10cm

20cm

30cm

40cm

10cm

20cm

30cm

40cm

2kgkg

2kg

Fig 3

* 1. What is torque created by the mass on the right?
  2. What is the torque created by the mass on the left?
  3. What is the current net torque?
  4. What would be the angular acceleration of this system?
  5. If you had a 1kg mass, where would you place it to balance this system?

0cm

10cm

20cm

30cm

40cm

10cm

20cm

30cm

40cm

Fig 4

1. See figure 4. Assume the balance has negligible mass.
   1. You have two masses, M1 and M2.   
        
      M1 has twice the mass of M2. If they are each placed at 30cm left   
        
      and 30cm right, respectively, what will be the net torque of the system, in terms of m2?
   2. What will be the angular acceleration (α) of this system?
   3. Suppose you have a third mass, M3. M3 has ½ the mass of M2. Where would you place M3 to balance this system?