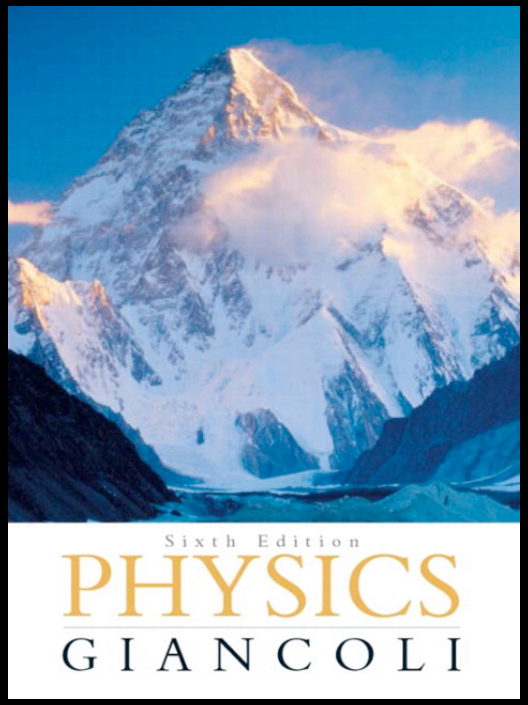


ConcepTest PowerPoints

Chapter 9

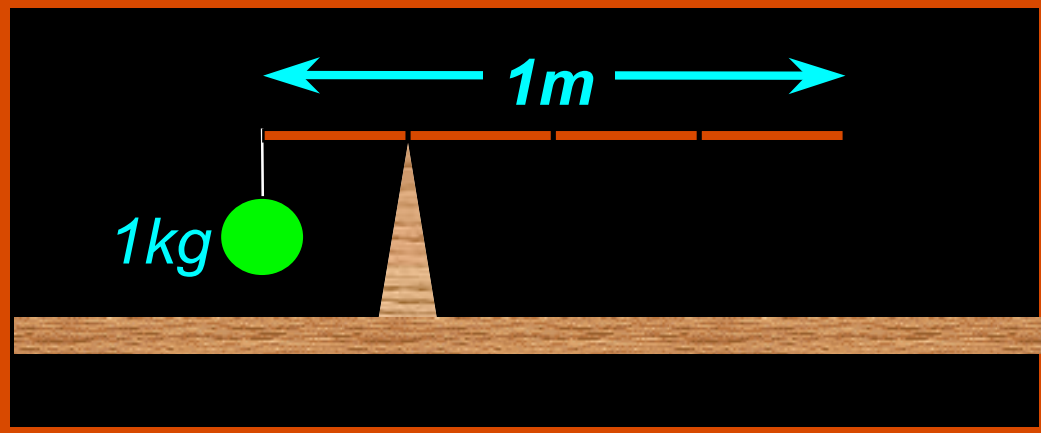
Physics: Principles with Applications, 6th edition

Giancoli

ConcepTest 9.1 Balancing Rod

A 1 kg ball is hung at the end of a rod 1 m long. If the system balances at a point on the rod 0.25 m from the end holding the mass, what is the mass of the rod?

1) 1/4 kg
2) 1/2 kg
3) 1 kg
4) 2 kg
5) 4 kg



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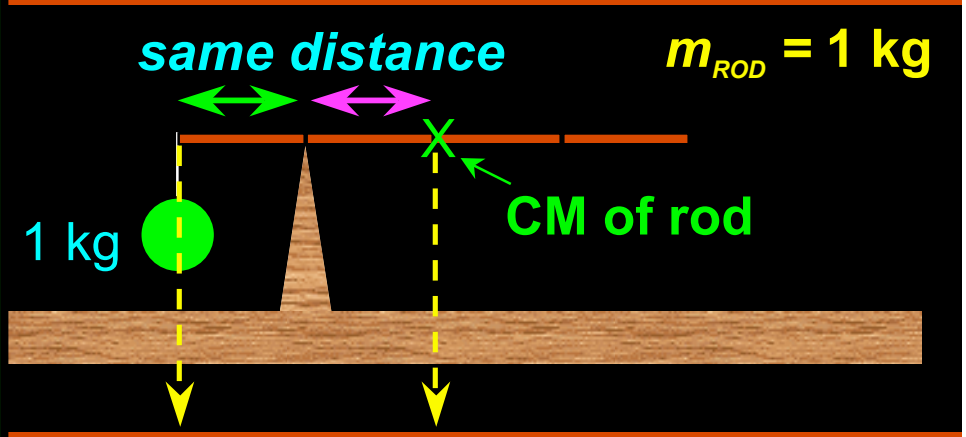
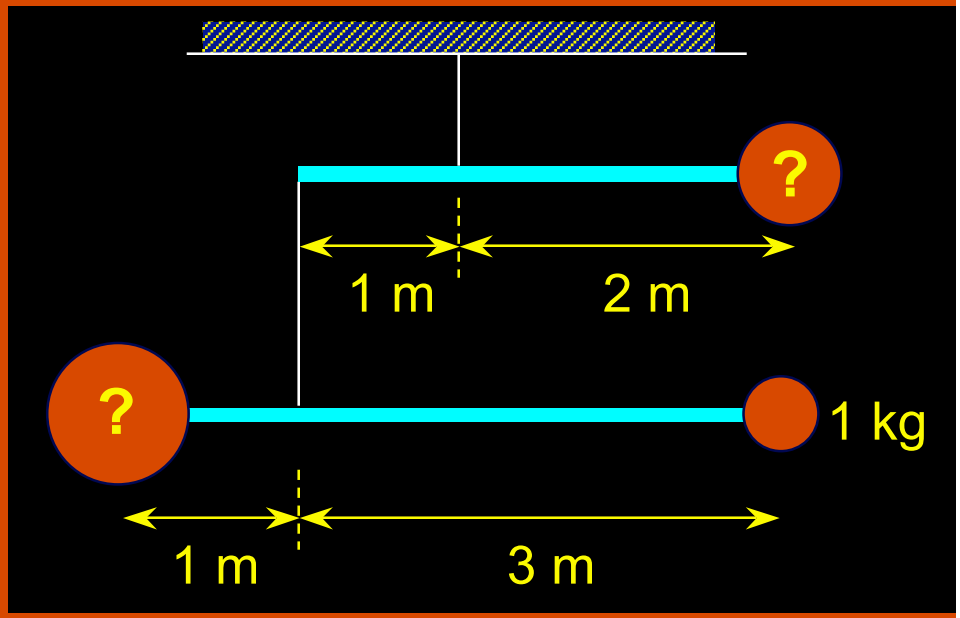
The total torque about the pivot must be zero !! The CM of the rod is at its center, 0.25 m to the right of the pivot. Since this must balance the ball, which is the same distance to the left of the pivot, the masses must be the same !!



ConcepTest 9.2 Mobile

A (static) mobile hangs as shown below. The rods are massless and have lengths as indicated. The mass of the ball at the bottom right is 1 kg. What is the total mass of the mobile?

1) 5 kg
2) 6 kg
3) 7 kg
4) 8 kg
5) 9 kg



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4) 8 kg
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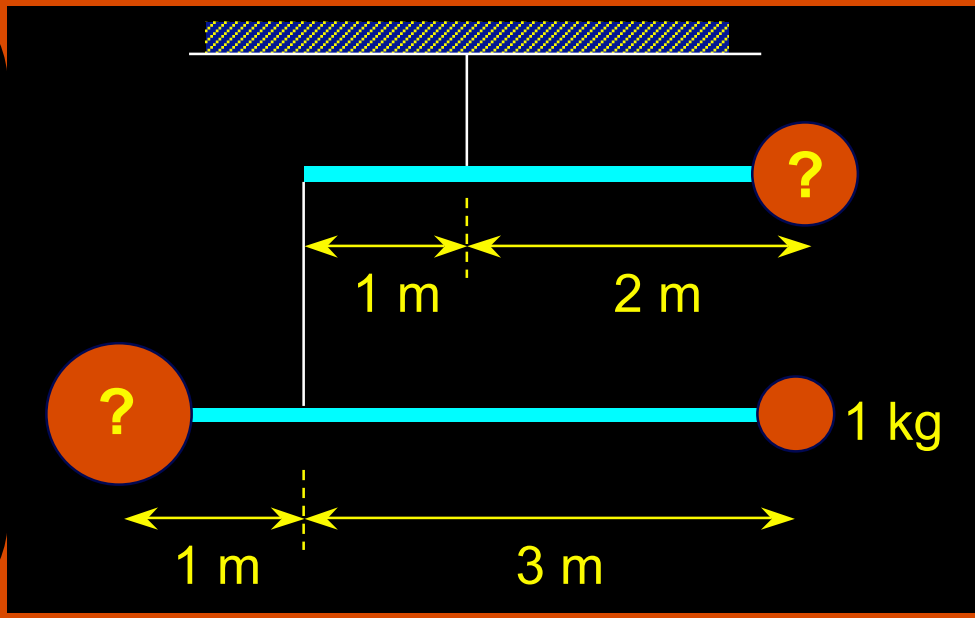
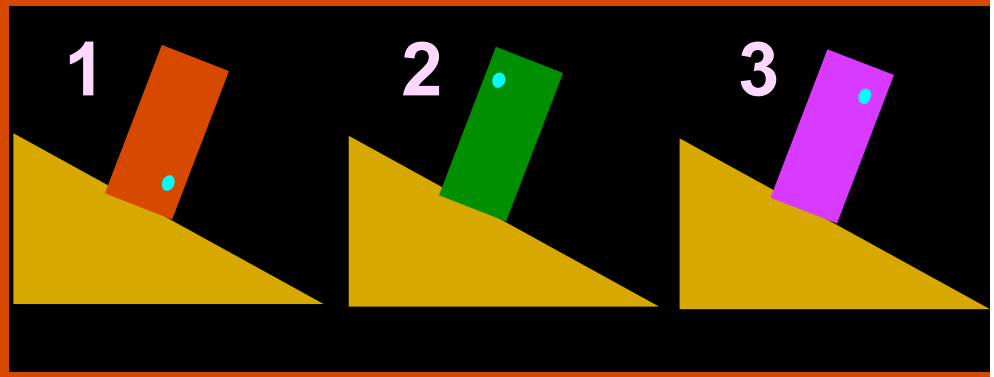
Use torques in two steps: (1) find the big mass on the bottom left (lower rod only). (2) use the entire lower rod assembly (with two masses) to find the mass on top right. Finally, add up all the masses.



ConcepTest 9.3a Tipping Over I

A box is placed on a ramp in the configurations shown below. Friction prevents it from sliding. The center of mass of the box is indicated by a blue dot in each case. In which case(s) does the box tip over?

1) all
2) 1 only
3) 2 only
4) 3 only
5) 2 and 3



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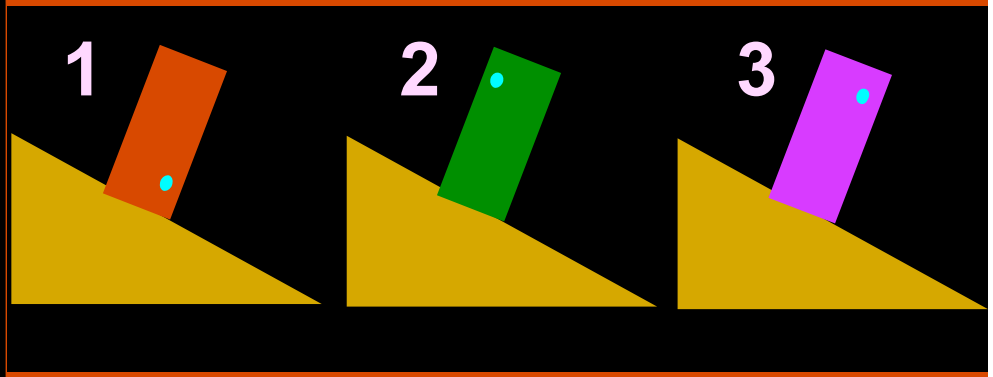
1) all
2) 1 only
3) 2 only
4) 3 only
5) 2 and 3

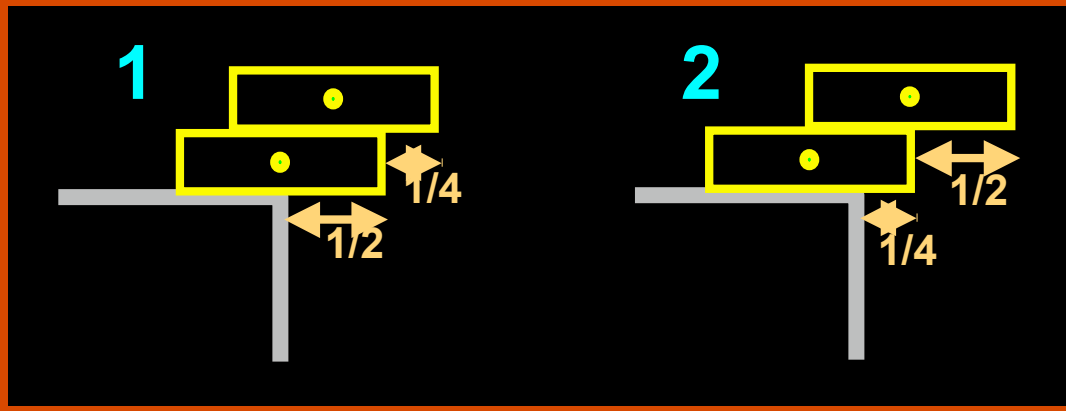
The torque due to gravity acts like all the mass of an object is concentrated at the CM. Consider the bottom right corner of the box to be a pivot point. If the box can rotate such that the CM is lowered, it will !!



ConcepTest 9.3b Tipping Over II

Consider the two configurations of books shown below. Which of the following is true?

1) case 1 will tip
2) case 2 will tip
3) both will tip
4) neither will tip



ConcepTest 9.3b Tipping Over II

Consider the two configurations of books shown below. Which of the following is true?

1) case 1 will tip
2) case 2 will tip
3) both will tip
4) neither will tip

The CM of the system is midway between the CM of each book. Therefore, the CM of case #1 is not over the table, so it will tip.