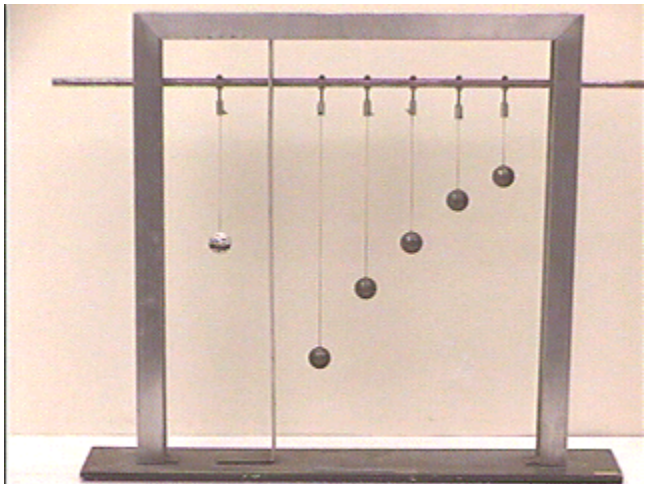
Answer #222

The answer is (c): the center pendulum will move a lot, while all four of the others will move, but with much less amplitude, as can be seen by clicking your mouse on thephotograph below.



This is an example of a resonance. The center pendulum on the right is the same length as the pendulum on the left, so they will have the same oscillation frequency and will therefore be "in resonance." This means that when either one of them oscillates the energy is easily transferred to the other because either one, when set into motion, will readily "drive" the other, with the rocking of the support rod providing the coupling mechanism. Note that because the other pendula are not the same length, and therefore do not oscillate at the same frequency, they are not in resonance and will not be driven to large amplitudes of oscillation. Although the rocking motion of the coupling rod does in fact drive the other four pendula to relative degrees, by the time the amplitude of their oscillation builds up to a significant level the driving force becomes out of phase and causes their motion to cease.

The concept of resonance is extremely important in physics, and plays a critical role in physical phenomena dealing with mechanical vibrations, sound, light, and quantum physics.

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