



Physic² 121: Phundament[°]Is of Phy²ics I

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PHYS 121

Energy

- Kinetic Energy (energy of motion)
 - Scalar, i.e. doesn't depend on direction
 - Always positive (or zero)

$$KE = \frac{1}{2}mv^2$$

- Gravitational Potential Energy
 - h is height above some reference point

$$PE_{grav} = mgh$$

- If gravity is only force, total energy is:
 - Total energy is conserved, but can change from kinetic to potential, and vice versa.

$$E_{total} = \frac{1}{2}mv^2 + mgy$$



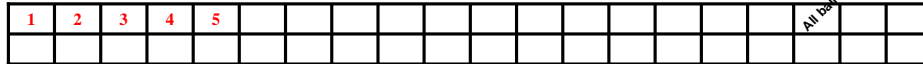
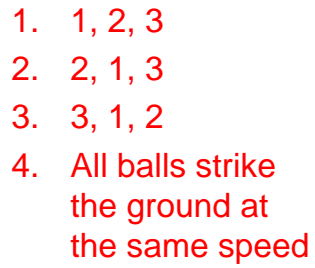
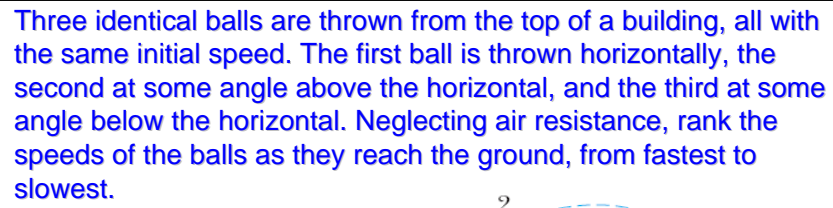
Demonstrations



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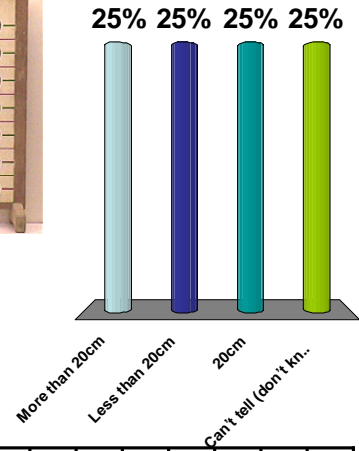
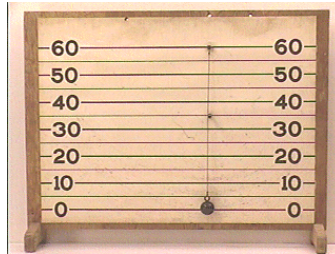


A pendulum swings next to a board with a peg at a point below the pivot. When the string hits the peg, it will swing from that point.

If the pendulum is raised on the left a height of 20 cm, how far up will it go on the right after hitting the peg?



1. More than 20cm
2. Less than 20cm
3. 20cm
4. Can't tell (don't know mass of the ball, length of string, etc.)



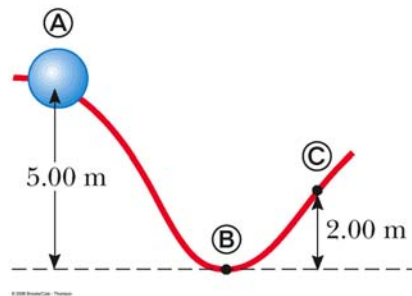
1	2	3	4	5															

Example Problem (5.34)

- A projectile is launched with a speed of 40 m/s at an angle of 60° above the horizontal. Use conservation of energy to find the maximum height reached by the projectile during its flight.

Example Problem (5.36)

- A 0.400 kg bead slides on a curved wire, starting from rest at point A. The wire is frictionless between A and B, and rough between B and C.
- a) Find its speed at B
- b) If the bead comes to rest at C, find the loss in mechanical energy as it goes from B to C



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