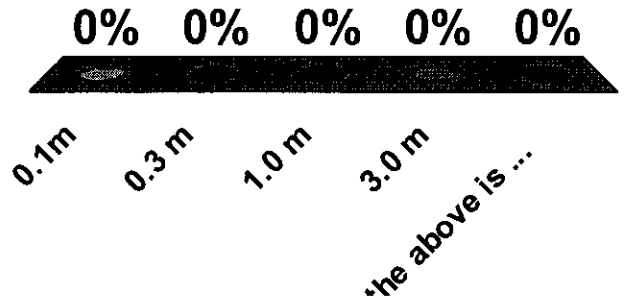
A 1.0 kg. pendulum has a kinetic energy of 1.0 Joule at the lowest point in its swing. How high does it travel to its stopping point?

1. 0.1m
2. 0.3 m
3. 1.0 m
4. 3.0 m
5. None of the above is correct within 10%



The correct answer is #1: h_{MAX} =0.1m

- Neglecting air resistance, mechanical energy is conserved: KE +PE = ME = constant.
- For gravity, $(PE)_{Grav} = m*g*h$ at height, h.
- Take PE to be zero at initial (lowest) point. Then ME = $(KE)_{initial}$ + 0 = 1 Joule = constant.
- At h = h_{MAX}, the pendulum comes to rest, so that KE = 0 at that point; i.e., ME = PE_{MAX} + 0;
- Therefore 1 J = $PE_{MAX} = m*g*h_{MAX}$, so that
  => $h_{MAX} = (KE)_{initial} / m*g = 1J/1kg*10m/s^2$
- i.e. = h_{MAX} = 0.1m (Answer #1)