1. A golfer hits a putt which stops 1/3 of the way to the hole. If the ball was hit with speed v_0 and the friction due to the grass stays the same, what speed should she have given the ball to just reach the hole

(A) sqrt(2)v_0 (B) 2 v_0 (C) sqrt(3)v_0 (D) 3 v_0 (E) 9 v_0

d=distance to hole F=friction force v=velocity to just reach the hole

$\frac{1}{2}mv_0^2 = Fd/3 \rightarrow Fd = 3/2\ mv_0^2$

$\frac{1}{2}mv^2 = Fd \rightarrow \frac{1}{2}mv^2 = 3/2\ mv_0^2 \rightarrow v^2 = 3v_0^2 \rightarrow$ **Correct answer is C**

2. A ball drops some distance and loses 30 J of gravitational potential energy. Don't ignore air resistance. How much kinetic energy did the ball gain?

(A) > 30 J (B) = 30 J (C) < 30 J (D) Need more info

Correct answer is C because some energy is lost to air resistance

3. How much work does the force of gravity do when a an object which weighs 50 N falls a distance of 10.0 m?

(A) 98 J (B) 500 J (C) 51 J (D) 125 J

Work = Weight * Distance = 50 * 10 J = 500 J → **Correct answer is B**

4. A spring having a force constant k=15.0 N/cm and an unstretched length of 20.0 cm is pulled so that it is 23.0 cm long. The force required to stretch it this much is

(a) 45 N (b) 300 N (c) 322.5 N (d) 345 N

F = -kx = -15 N/cm * 3 cm = -45 N → **Correct answer is A**

5. Two balls are thrown from the roof of a house with the same initial speed. Ball 1 is thrown horizontally, ball 2 is thrown at an angle of 20^o above the horizontal. Which one hits the ground with the greatest speed (no air resistance)

(a) Ball 1 (b) Ball 2 (c) Speeds are the same (d) Depends on the masses

Conservation of energy: $\frac{1}{2}mv_0^2 + mgh = \frac{1}{2}mv^2$, where v_0 is the initial velocity and v is the final velocity. **Correct answer is C**