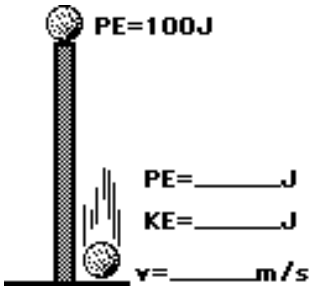
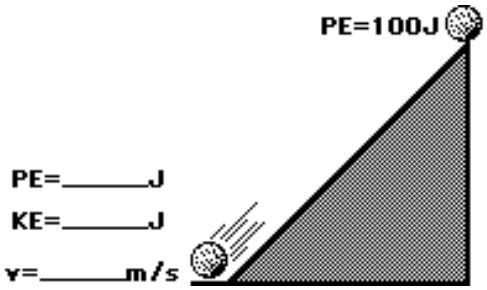
Conservation of Energy Practice Name:_____

1. Consider the falling motion of the ball in the following two frictionless situations. Also simplify the conservation of energy equation and use it to find the kinetic energy and the velocity of the 2-kg ball just prior to striking the ground.

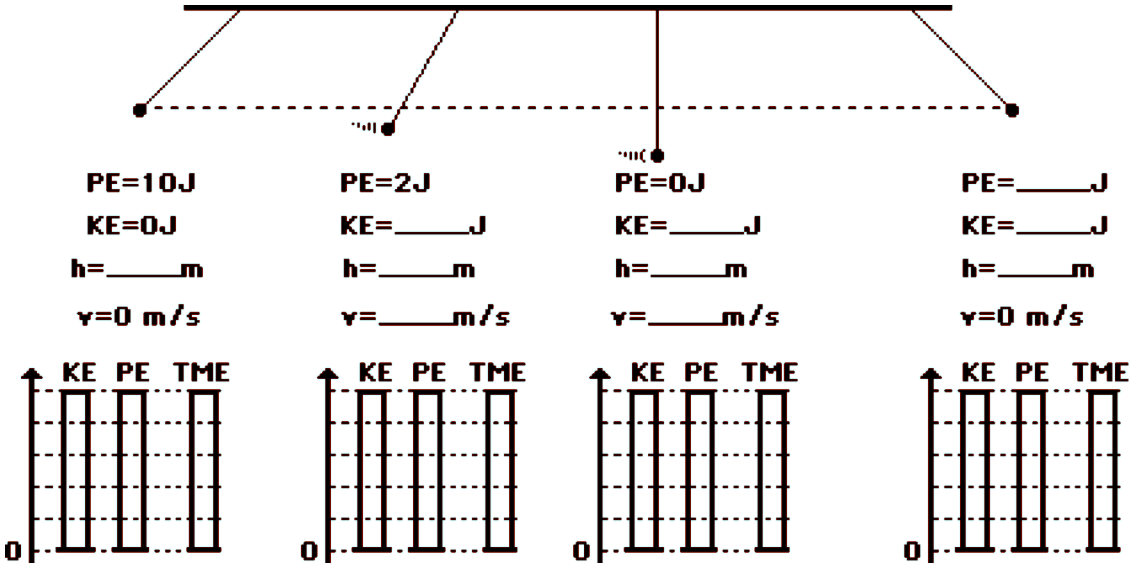


$KE_i + PE_i = KE_f + PE_f$

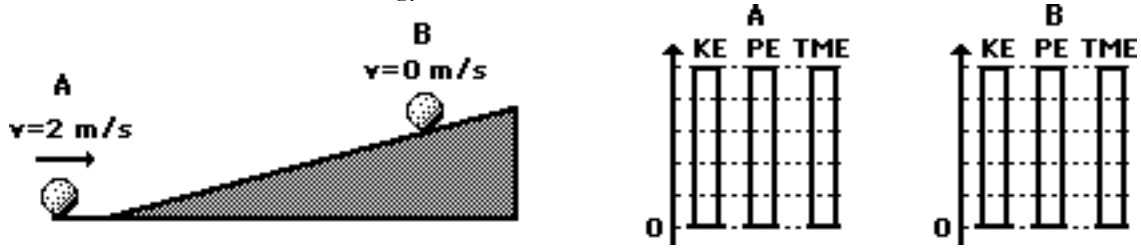


$KE_i + PE_i = KE_f + PE_f$

2. Use conservation of energy to fill in the blanks for the following system (m=2 kg). Neglect frictional forces. Finally, darken in the bars of the bar chart in order to demonstrate the amount of kinetic energy (KE), potential energy (PE) and total mechanical energy (TME).



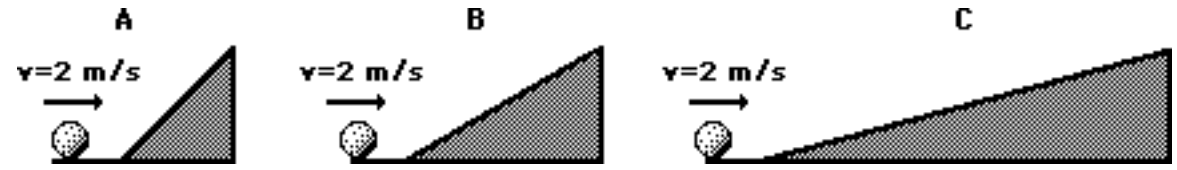
3. A 2-kg ball moving at 2 m/s is rolling towards an inclined plane. It eventually rolls up the hill to a position near the top where it momentarily stops prior to rolling back down he incline. Assume negligible friction and air resistance. Construct an energy bar chart for the ball.



Simplify the equation below by canceling terms that are either zero or constant. Then use the equation to determine the height to which the ball rises along the incline before stopping.

$$\frac{1}{2} * m * v_i^2 + m * g * h_i = \frac{1}{2} * m * v_f^2 + m * g * h_f$$

4. Three identical balls approach three different "frictionless" hills with a speed of 2 m/s. In which case - A, B, or C, (or a tie) - will the ball roll the highest? _____

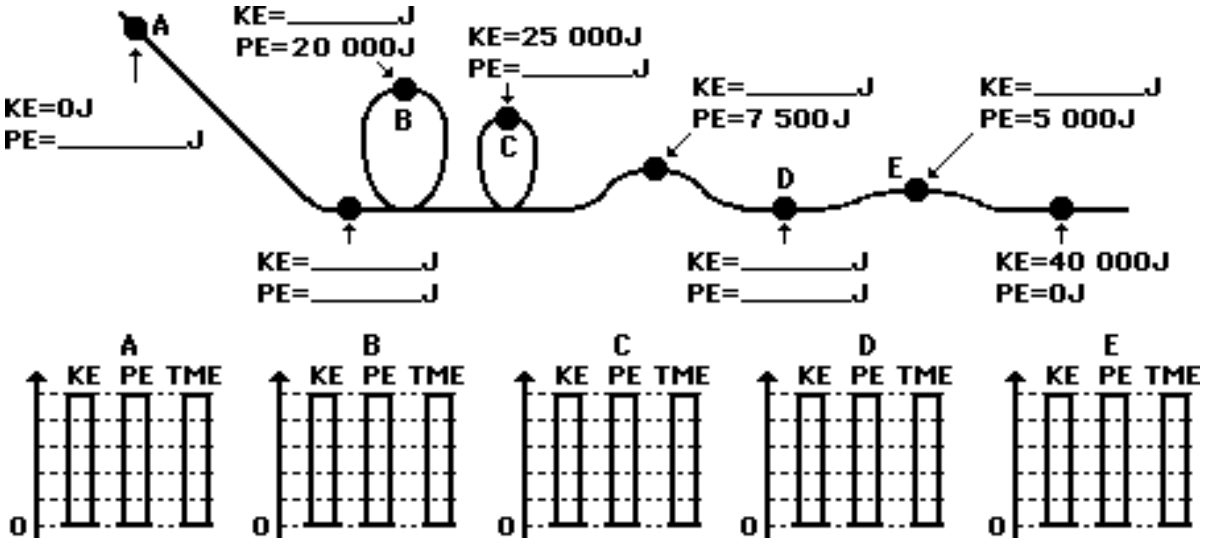


Explain your answer.

5. Fill in the blanks in the following sentence:

An object starts from rest with a potential energy of 600 J and free-falls towards the ground. After it has fallen to a height of one-fourth of its original height, its total mechanical energy is _____ J, its potential energy is _____ J, and its kinetic energy is _____ J.

6. Use the law of conservation of energy (assume no friction nor air resistance) to determine the kinetic and potential energy at the various marked positions along the roller coaster track below. Finally, fill in the bars of the bar charts for positions A, B, C, D, and E.



7. Use the law of conservation of energy (assume no friction) to fill in the blanks at the various marked positions for a 1000-kg roller coaster car.