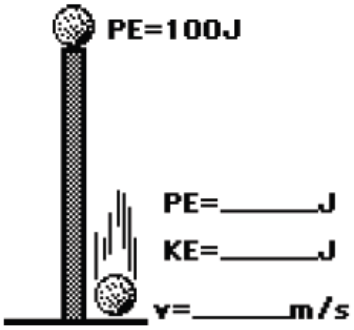
Conservation of Energy Concepts **Name**_____
Physics

1.

Consider the falling motion of the ball in the following two <u>frictionless</u> situations. For each situation, indicate the forces doing work upon the ball. Indicate whether the energy of the ball is conserved and explain why. Finally, simplify the work-energy equation and use it to find the kinetic energy and the velocity of the 2-kg ball just prior to striking the ground.



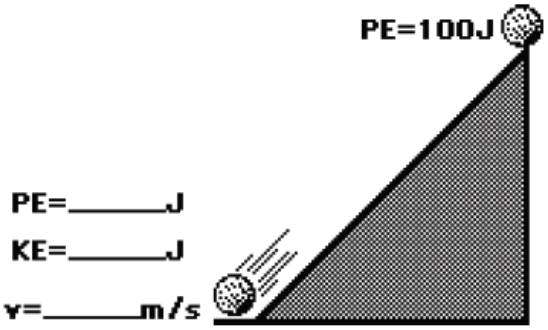
Forces doing work?

_____

Energy Conserved: Yes or No?

Explanation: _____

_____



Forces doing work?

_____

Energy Conserved: Yes or No?

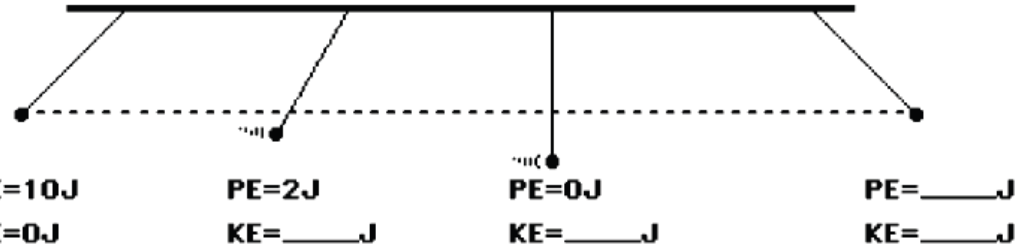
Explanation: _____

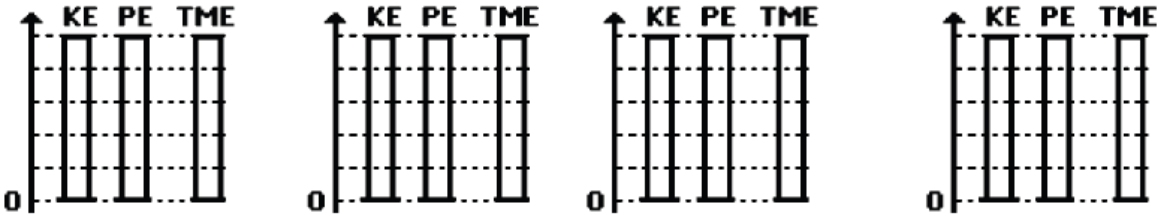
_____

Do both balls reach the bottom of the ramp in the same amount of time? Explain.

2.

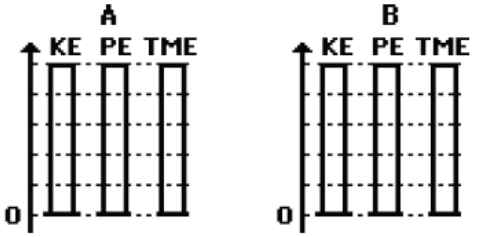
Use the work-energy relationship to fill in the blanks for the following system (m=2 kg). Neglect frictional forces. Finally, darken in the bars of the bar chart in order to demonstrate the amount of kinetic energy (KE), potential energy (PE) and total mechanical energy (TME).





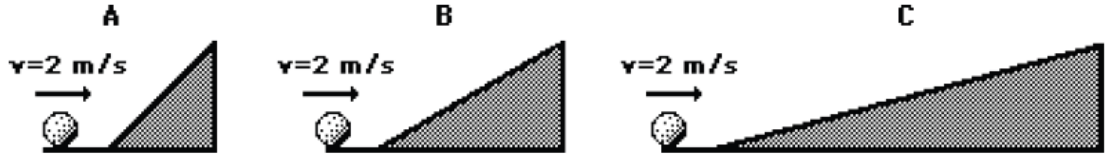
3.

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 a energy bar chart for the ball.



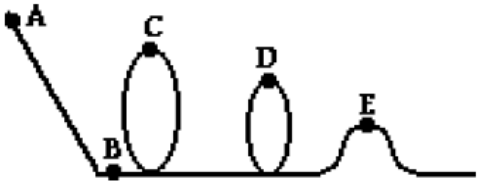
4.

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.

Consider the diagram at the right in answering the next three questions. Five locations along a roller coaster track are shown. Assume that there are negligible friction and air resistance forces acting upon the coaster car.



Rank the five locations in order of increasing TME (smallest to largest TME). Use > and or = signs between the blanks.

letter sign letter sign letter sign letter sign letter

Rank the five locations in order of increasing PE (smallest to largest PE). Use > and or = signs between the blanks.

letter sign letter sign letter sign letter sign letter

Rank the five locations in order of increasing KE (smallest to largest KE). Use > and or = signs between the blanks.

letter sign letter sign letter sign letter sign letter

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.