

NAME:

P. D.

Energy - Practice Problems

Kinetic Energy ($KE = \frac{1}{2} m v^2$)

- 1) The velocity of a car is 65 m/s and its mass is 2515 kg. What is its KE?

- 2) If a 30 kg child were running at a rate of 9.9 m/s, what is his KE?

- 3) A 6.57 kg ball rolls across the street at a rate of 7 m/s. What is the KE of the ball before it hits the curb?

- 4) A 9800 kg plane is traveling at a rate of 400 m/s. What is the KE of the plane?

- 5) A girl is riding her bike at a speed of 12 m/s. She weighs 55 kg and her bike weighs 22 kg. What is the KE of the girl and her bike?

- 6) A paper airplane flies through the air at a speed of 16 m/s. The paper airplane has a mass of 0.34 kg. What is its KE?

Potential Energy ($PE = mgh$)

7) A brick is suspended above the ground at a height of 6.6 m. It has a mass of 5.3 kg. What is the PE of the brick?

8) A boy stands on a high-dive that is 4.8 m tall. If the boy has a mass of 66 kg, what is his PE?

9) A sky diver is preparing to jump out of a plane that is flying at a height of 2200 m. If the sky diver has a mass of 78 kg, what is her PE?

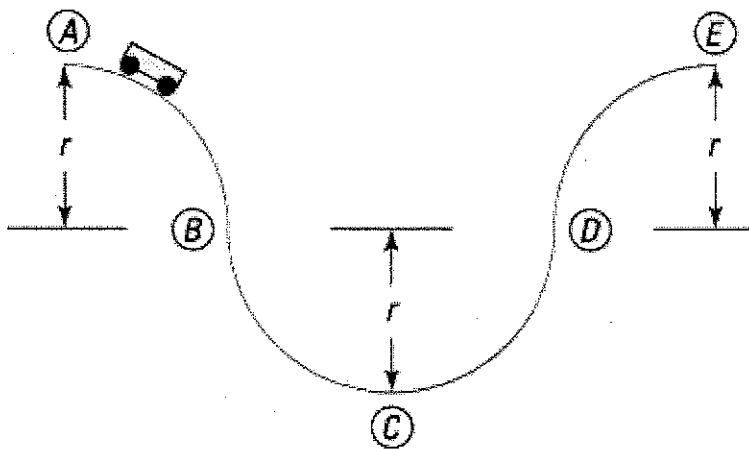
10) A 4812 kg boulder sits on top of a 203 m cliff. What is its PE?

11) The boulder in problem 10 begins to fall. What is its PE when it reaches 75 m above the ground?

12) What is the PE of the boulder as it smashes into the ground?

1. A 40kg object is dropped from the top of a 200 meter building. Neglecting air resistance, what will the object's velocity be just before striking the ground?
2. A truck with a mass of 4,000 kg is coasting (assume a frictionless environment) at 50 m/s. It strikes a 40kg stationary object, which sticks to the grill of the truck. What will the speed of the truck and object be immediately after the collision?
3. Use the following picture of a cart of mass 1000kg moving on a roller coaster, as well as the accompanying information, to answer the following question.

The section of track displayed is frictionless and composed entirely of semicircular pieces of radius r . The letters A through E refer to specific locations along the track.



If $r = 12$ meters, and if the cart's velocity at point A is 3 meters per second, what is the cart's velocity at point D? Round your answer to the nearest tenth of a meter per second.

4. When loaded with passengers, the cart is expected to weigh 1400kg. What is the loaded cart's velocity at Point D? Can you explain your results?

PE = 100 J
KE = 0 J

200 kg

PE = 50 J
KE = A J
v = B m/s

PE = C J
KE = D J
v = E m/s

PE = F J
KE = G J
v = H m/s

PE = I J
KE = J J
v = K m/s