

Energy Review

Kinetic Energy - energy that an object has when in movement.

Formula $KE = \frac{1}{2}mv^2$

$KE = \frac{1}{2}(\text{mass})(\text{velocity})^2$

→ Kinetic Energy is measured in JOULES

Mass is measured in KILOGRAMS

Velocity is measured in METERS/SECOND

Potential Energy - Stored energy that can become kinetic energy.

Formula $PE = m \cdot g \cdot h$

$PE = (\text{mass})(\text{gravity})(\text{height})$

→ Mass is measured in KILOGRAMS

Gravity is always 9.8 unless given something diff.

Height is measured in METERS

Mechanical Energy - The sum of KE & PE

Formula $ME = gPE + KE$

$ME = (m \cdot g \cdot h) + (\frac{1}{2}mv^2)$

→ ME, gPE, & KE are measured in JOULES

Energy Problems Ex.

Kinetic Energy →

Determine the kinetic energy of a 625kg roller coaster car that is moving with a speed of 18.3m/s.

Formula → $KE = \frac{1}{2}mv^2$

Substitute → $KE = \frac{1}{2}(625)(18.3)^2$

Simplify → $KE = 104653.125 \text{ J}$

Potential Energy →

A box has a mass of 5.8kg. The box is lifted from the garage floor and placed on a shelf. If the box gains 145J of Potential Energy how high is the shelf?

Formula → $PE = m \cdot g \cdot h$

Substitute → $145 = (5.8)(9.8)(h)$

Simplify → 2.55 m

Mechanical Energy →

What is the Mechanical energy in a 1.1kg ball that was dropped, has a velocity of 2m/s, and is 1.4m above the ground?

Formula → $ME = gPE + KE$

Substitute → $ME = (1.1)(9.8)(1.4) + (\frac{1}{2})(1.1)(2)^2$
 $= 15.092 + 2.2$

Simplify → $= 17.292 \text{ J}$