

CONCEPT: KINETIC & POTENTIAL ENERGY

- **Mechanical Energy:** energy an object possesses due to its _____ as *kinetic energy* or _____ as *potential energy*.

Mechanical Energy

The Kinetic Energy Formula is used for an object in motion that has a **mass** and **velocity**.

Kinetic Energy: Velocity Formula

$$\text{K.E.} = \frac{1}{2} mv^2$$

☐ **m** = Mass of the gas in _____.

☐ **v** = Velocity of the gas in _____.

☐ Kinetic Energy is in Joules (J) or _____.

The Potential Energy formula is used for a stationary object that has a **mass** and **height**.

Potential Energy Formula

$$\text{P.E.} = mgh$$

☐ **m** = Mass of the object in _____.

☐ **g** = Acceleration due to gravity in _____.

☐ **h** = Height of the object in _____.

EXAMPLE: Calculate the kinetic energy (in kJ) of an electron ($m = 9.11 \times 10^{-31}$ kg) moving at 1.59×10^6 m/s.

PRACTICE: A radioactive particle weighing 7.20×10^3 ng is found 110 m above the earth's surface. What is its potential energy?

Energy Interconversions

- Since both *kinetic energy* and *potential energy* are forms of mechanical energy you can convert between them.

Mechanical Energy Conversions

$$\text{K.E.} = \text{P.E.}$$

$$\frac{1}{2} mv^2 = mgh$$

EXAMPLE: A neutron weighing 1.67×10^{-27} kg is shot from a laser projector that is mounted 120.0 meters above the ground. What is its speed when it hits the ground?