

What is Potential Energy?

Worksheet

Potential energy is $PE = mgh$, measured in joules (J), where m is mass in kg, g is gravitational acceleration (9.8 m/s on Earth), and h is height above a chosen reference point.

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

Questions

1. A 5 kg object is 4 m above the ground ($g = 9.8$ m/s). Find its potential energy.

- A) 196 J
- B) 49 J
- C) 20 J
- D) 980 J

2. Potential energy depends on which factors?

- A) Mass and velocity
- B) Mass, height and gravitational acceleration
- C) Only height
- D) Only mass

3. How is the reference point ($h = 0$) for potential energy chosen?

- A) Always ground level
- B) Arbitrarily, but it must be defined
- C) Always sea level
- D) Fixed by nature

4. If height doubles and other factors stay constant, potential energy

- A) Doubles
- B) Quadruples
- C) Halves
- D) Stays the same

5. A 2 kg book sits 3 m above the floor. Find its potential energy ($g = 9.8$ m/s).

6. A 50 kg elevator is raised 10 m. Find its potential energy.

7. A 5 kg object is lifted 2 m. Find its potential energy.

8. Define: What is gravitational potential energy?

9. Define: What is the formula for potential energy?

10. Define: What is the unit of potential energy?

Answer Key

1. A) $196 \text{ J} - \text{PE} = 59.84 = 196 \text{ J}$.
2. B) Mass, height and gravitational acceleration - $\text{PE} = mgh$ needs mass, height and g .
3. B) Arbitrarily, but it must be defined - Any convenient level can be chosen as the zero-height reference.
4. A) Doubles - PE is directly proportional to h , so it doubles.
5. $\text{PE} = mgh = 29.83 \text{ PE} = 58.8 \text{ J}$
6. $\text{PE} = mgh = 509.810 \text{ PE} = 4900 \text{ J}$
7. $\text{PE} = mgh = 59.82 \text{ PE} = 98 \text{ J}$
8. Stored energy due to an object's height above a reference point: $\text{PE} = mgh$.
9. $\text{PE} = mgh$, where m is mass, g is gravitational acceleration, h is height.
10. The joule (J), same as all forms of energy.

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