

What is Free Fall?

Worksheet

Free fall is the motion of an object falling only under gravity, accelerating at $g = 9.8 \text{ m/s}^2$. Velocity grows as $v = gt$ and distance fallen is $h = \frac{1}{2}gt^2$.

$$v = gt, y = \frac{1}{2}gt^2$$

Questions

1. An object falls from rest for 4 s. What is its velocity ($g = 9.8 \text{ m/s}^2$)?
A) 9.8 m/s
B) 19.6 m/s
C) 39.2 m/s
D) 78.4 m/s
2. A feather and a hammer are dropped together in a vacuum. Which lands first?
A) The hammer
B) The feather
C) They land together
D) Depends on shape
3. An object falls from rest for 2 s. How far has it fallen ($g = 9.8 \text{ m/s}^2$)?
A) 9.8 m
B) 19.6 m
C) 4.9 m
D) 39.2 m
4. What force(s) act on an object in true free fall?
A) Gravity and air resistance
B) Only gravity
C) Only air resistance
D) No forces
5. An object is dropped and falls for 3 s. Find the distance fallen and its final velocity ($g = 9.8 \text{ m/s}^2$).
6. An object falls from rest for 5 s. Find its velocity.
7. An object falls 20 m from rest. Find the time it takes.
8. Define: What is free fall?
9. Define: Does mass affect free-fall acceleration?
10. Define: Formula for velocity in free fall (starting from rest)?

Answer Key

1. C) $39.2 \text{ m/s} - v = gt = 9.8 \cdot 4 = 39.2 \text{ m/s}$.
2. C) They land together - Without air resistance, both accelerate at the same rate g and land simultaneously.
3. B) $19.6 \text{ m} - h = gt = 0.5 \cdot 9.8 \cdot 4 = 19.6 \text{ m}$.
4. B) Only gravity - True free fall means only gravity acts - no air resistance or other forces.
5. $h = gt = 0.5 \cdot 9.8 \cdot 3 = 0.5 \cdot 9.8 \cdot 9 = 44.1 \text{ m}$ $v = gt = 9.8 \cdot 3 = 29.4 \text{ m/s}$
6. $v = gt$ $v = 9.8 \cdot 5$ $v = 49 \text{ m/s}$
7. $h = gt$ $t = (2h/g)$ $t = (2 \cdot 20 / 9.8)$ $t = 4.08$ $t \approx 2.02 \text{ s}$
8. Motion of an object under gravity alone, with no air resistance or other forces.
9. No - all objects fall at the same rate g 9.8 m/s in a vacuum, regardless of mass.
10. $v = gt$

Bounlu

All cards, step-by-step solutions and an AI tutor are in the Notek app.
Promy turns exam dates into automatic reminders.