Projekt współfinansowany w ramach programu Unii Europejskiej Erasmus+

Knowledge Test: Free Falling Bodies

Questions

1. What is free fall in the context of Earth's gravitational field, according to the conclusions discussed?

A) Uniform motion along the lines of force of the gravitational field.

B) Uniformly accelerated motion in which the only force is the force of gravity (ignoring air resistance).

C) Motion in which the force of air resistance is greater than the force of gravity.

D) Motion in which acceleration is proportional to body mass.

2. Why does a heavy stone fall faster in the air than a flat sheet of paper (when dropped side by side)?

A) Earth's acceleration is greater for bodies with greater mass.

B) The force of gravity acting on the stone is smaller, which minimises air resistance.

C) The differences result from greater air resistance relative to weight for light and flat objects.

D) The stone has a higher density, which causes a decrease in acceleration.

3. What is the main conclusion from the demonstration in which a piece of paper was dropped on a board and then fell with it?

A) Gravity is the only force acting on a body falling through the air.

B) Under conditions of minimal air resistance (or in a vacuum), all bodies fall with the same acceleration, regardless of their mass.

C) The piece of paper and the board fall together only when their masses are equal.

D) The board creates a vacuum as it falls, allowing the paper to fall faster.

4. Write down the formula that correctly describes the distance S travelled in time t by a body in free fall with zero initial velocity, if the acceleration due to gravity is g.

5. What is the main physical parameter measured directly by the EMPE lidar sensor in this experiment?

A) Gravitational force.

B) Earth's acceleration g.

C) The instantaneous velocity of the body.

D) The distance of the falling object from the sensor (as a function of time).

6. What shape does the graph of distance versus time (s(t)) have for a freely falling body (with zero initial velocity)?

A) A straight, diagonal line passing through the origin of the coordinate system.

B) A straight line parallel to the time axis.

C) A parabola.

D) A hyperbola.

7. On the graph of acceleration versus time for a freely falling body (after discarding momentary measurement errors) should appear...

A) A straight line passing through zero and increasing linearly.

B) A parabola.

C) A straight line parallel to the time axis, at the level of g.

D) A straight, diagonal line passing through the origin of the coordinate system.

8. Which of the following causes is NOT considered to be the source of the discrepancy between the determined and tabulated values of the acceleration due to gravity g in this experiment?

A) Air resistance.

B) Imperfect deceleration of the body (e.g. initial velocity).

C) The independence of acceleration g from mass.

D) Sensor delays (data recording frequency limit).