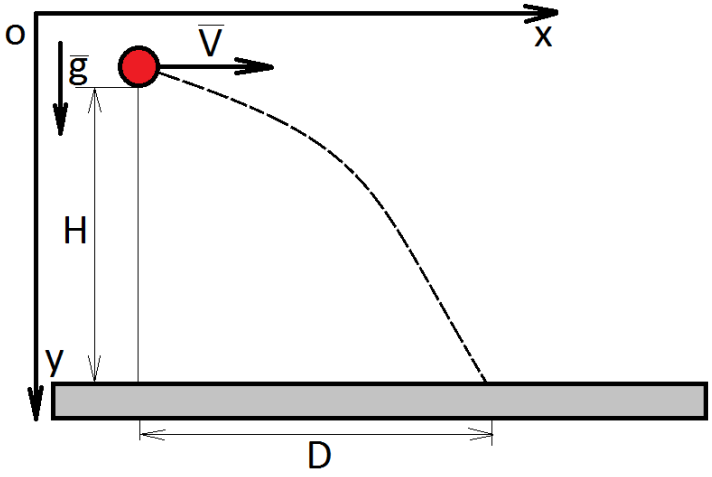
a plane flying horizontally at 100 m/s at a height of 1000 m releases a bomb. find
i) the time taken to reach the ground.
ii) the distance of the target

Solution:

After releasing, the bomb has the same speed as the plane. The equation of motion of the bomb to Y-axis: (t - time taken to reach the ground)



$$H = \frac{gt^2}{2}$$

$$t = \sqrt{\frac{2H}{g}} = \sqrt{\frac{2 \cdot 1000m}{9.8\frac{m}{s^2}}} = 14.28s\ (1)$$

The equation of motion of the bomb to X-axis: (D- distance of the target)

$$D = Vt(2)$$

$$(1)to(2): D = 100\frac{m}{s} \cdot 14.28s = 1428m$$

Answer: 1) - time taken to reach the ground $t = 14.28s$

2) distance of the target $D = 1428m$