Answer on Question #43947 – Physics – Mechanics | Kinematics | Dynamics

Two partical moving in x directions such that u=3i and v=4i.due to gravition force they are coming downward direction.find their distance when both the velocities are perpendicular to each other.

Solution:
Velocity of the second body considering gravitational force (g − acceleration due to gravity):
$$\vec{u} = 3\vec{i} + gt\vec{j}$$
Velocity of the second body considering gravitational force
$$\vec{v} = 4\vec{i} + gt\vec{j}$$
Two vectors are perpendicular, when their scalar product is zero:
$$\vec{u} \cdot \vec{v} = 3\vec{i} \cdot 4\vec{i} + gt\vec{j} \cdot gt\vec{j} = 12 + g^2 t^2 > 0 \implies$$
Velocities will not be perpendicular to each other.

Answer: both the velocities will not be perpendicular to each other.