Answer on Question #48558, Physics, Mechanics - Kinematics - Dynamics

Rain is falling 6Km/h making angle 30degree with the vertical towards east. a man is walking on horizontal road towards east 5Km/h. the speed with which the rain hits the man is approximately...

Solution

Horizontal component of the rain in the man's coordinate system is

$$v_x = v_{xman} - v_{xrain} = v_{xman} - v_{rain}\sin 30° = 5\frac{km}{h} - 6\frac{km}{h}\cdot 0.5 = 2\frac{km}{h}$$

Vertical component of the rain in the man's coordinate system is

$$v_y = v_{yrain} = v_{rain}\cos 30° = 6\frac{km}{h}\cdot 0.5 = 5.2\frac{km}{h}$$

Therefore, the speed with which the rain hits the man is:

$$v = \sqrt{v_x^2 + v_y^2} = \sqrt{\left(2\frac{km}{h}\right)^2 + \left(5.2\frac{km}{h}\right)^2} = 5.6\frac{km}{h}$$

Answer: $v = 5.6\frac{km}{h}$