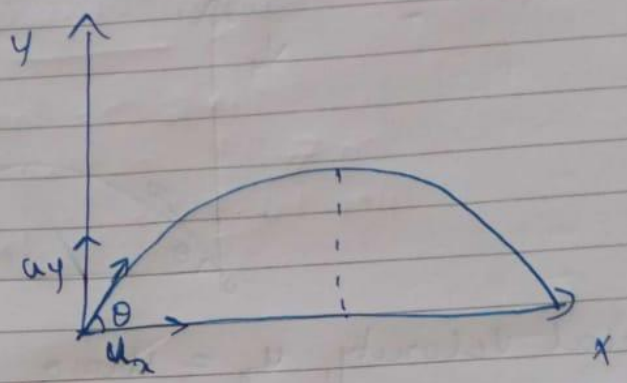

a:64.1°
b:295.9°



Horizontal Velocity $u_x = u\sin\theta$ $u\cos\theta$

Vertical velocity $u_y = u\sin\theta$

Reading angle $\theta = 64.1°$

Time $t = 2.5\,s$

Distance in y-direction

$$s_y = u_y t + \tfrac{1}{2} g t^2$$

$$= u\sin\theta \cdot t + -\tfrac{1}{2} \cdot 9.8 \cdot t^2$$

$$= u(\sin 64.1) \cdot t - \tfrac{1}{2}(9.8)\cdot(2.5)^2$$

$$= 2.248u - 30.625$$

$$u = \frac{30.625}{2.248}$$

$$u = 13.623 \text{ m/s}$$

Distance in x-direction

$$S_x = u_x t + \frac{1}{2} g t^2$$

$$= \left(u \cos\theta \cdot t + t \cdot V_{tail}\right) \cdot t$$

$$= \left(13.623 \cdot (\cos(64.1)) + 1.01\right) 2.4.$$

$$= 16.705 \text{ m/s}$$

Maximum horizontal range,

$$R_{max} = \frac{u^2 \sin 2\theta}{g}$$

Horizontal range at 45°

$$= \frac{u^2 \sin 2\theta}{g}$$

$$= \frac{(13.623)^2 \cdot 1}{9.8}$$

$$= 18.937 \text{ m}$$

Horizontal range at 36°,

$$= \frac{u^2 \sin 2\theta}{g}$$

$$= \frac{(13.623)^2 \cdot \sin(72^\circ)}{9.8}$$

$$= 18.01 \text{ m}$$

Measured Values

Time = 2.4 s

Distance = 16.~~7~~ m

V_{tail} = 1.01 m/s