Answer on Question 49941, Physics, Mechanics - Kinematics Dynamics The particle is projected with a velocity of $30 \mathrm{~m} / \mathrm{s}$ at an angle 40 above a horizontal plane. Find 1) the time for which the particle is in the air 2) the horizontal distance it travels
Solution
Vertical initial speed is

$$
v_{y 0}=v_{0} \sin \alpha=30 \cdot \sin 40^{\circ} \approx 19.3 \mathrm{~m} / \mathrm{s}
$$

Let us find time for which the particle is in the air. It is twice of the tame it takes particle to reach highest point. Hence

$$
t_{t}=2 t_{h}=2 \frac{v}{g}=2 \frac{19.3}{9.8} \approx 3.9 \mathrm{~s}
$$

Now we can find horizontal distance. It is equal to total time $t_{t}$ times horizontal velocity

$$
l=v_{x 0} t_{t}=v_{0} \cos \alpha \cdot t_{t}=30 \cdot \sin 40^{\circ} \cdot 3.9 \approx 90 \mathrm{~m}
$$

