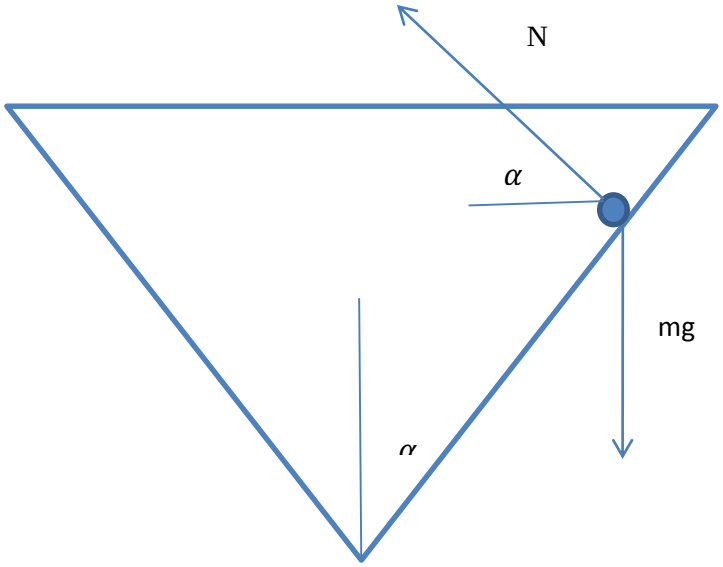
Answer on Question #47859, Physics, Other

Question:

a particle describes a horizontal circle on the smooth surface of an inverted cone. the plane of that circle is at a height of 9.8cm above the vertex. then the speed of the particle is?

Answer:



Newton's laws of motion:

$$N\cos\alpha = m\frac{v^2}{r}$$

$$N\sin\alpha = mg$$

Where $r = h\tan\alpha$ is radius of motion.

From first 2 equations have:

$$\tan\alpha = \frac{mg}{m\frac{v^2}{r}} = \frac{g}{v^2}h\tan\alpha$$

$$v = \sqrt{gh} = \sqrt{9.8\frac{m}{s^2}\ 9.8\ m} = 9.8\frac{m}{s}$$

Answer: $9.8\frac{m}{s}$