Answer on Question #52383, Physics, Mechanics | Kinematics | Dynamics

A cricket bowler can bowl a 158 g ball at 147 km/hr. Calculate the kinetic energy of this bowl and use this to compare to a bowling ball that weighs 7 kg. How fast would the bowling ball need to be bowled to have the same kinetic energy as the cricket ball? (Answer to 1 d.p)

Solution:

The following equation is used to represent the kinetic energy (KE) of an object.

$$KE = \frac{1}{2}mv^2$$

where m = mass of object,

v = speed of object.

The speed of cricket ball is

$$v = 147\frac{\text{km}}{\text{hr}} = 147 * \frac{1000}{3600}\text{ m/s} = 40.83\text{ m/s}$$

The kinetic energy of cricket bowl is

$$KE_{cricket} = \frac{1}{2} * 0.158 * 40.83^2 = 131.70\text{ J}$$

The kinetic energy of bowling bowl is

$$KE_{bowling} = \frac{1}{2}mv^2 = \frac{7}{2}v^2 = KE_{cricket}$$

Thus, the speed of the bowling ball is

$$v = \sqrt{\frac{2}{7}KE_{cricket}} = \sqrt{\frac{2}{7} * 131.7} = 6.13\text{ m/s} = 6.13 * 3.6 = 22.1\text{ km/hr}$$

Answer: 22.1 km/hr