A building superintendent twirls a set of keys in a circle at the end of a cord. If the keys have a centripetal acceleration of 127 m/s^2 and the cord has a length of 0.22 m, what is the tangential speed of the keys?

Solution.

$$a = 127\frac{m}{s^2}, r = 0.22m;$$

$$\upsilon - ?$$

The centripetal acceleration is:

$$a = \frac{\upsilon^2}{r},$$

υ – the tangential speed of the keys;

r – the length of the cord.

The tangential speed of the keys:

$$\upsilon^2 = ar;$$

$$\upsilon = \sqrt{ar}.$$

$$\upsilon = \sqrt{127\frac{m}{s^2} \cdot 0.22m} = 5.3\frac{m}{s}.$$

Answer: The tangential speed of the keys is $\upsilon = 5.3\frac{m}{s}$.