

54 When a chameleon captures an insect, its tongue can extend 16cm in 0.10s.

(1) Find the magnitude of the tongue's acceleration, assuming it to be constant.

(2) In the first 0.050s, does the tongue extend 8.0cm? Calculate.

(1) solution

$$\Delta x = 16 \text{ cm} \quad \begin{array}{l} \text{or} \\ \rightarrow \left\{ \begin{array}{l} x_i = 0 \text{ cm} \\ x_f = 16 \text{ cm} \end{array} \right. \end{array}$$

$$\Delta t = 0.10 \text{ s}$$

$$a = ?$$

$$v_i = 0 \text{ m/s}$$

$$x_f = x_i + v_i \Delta t + \frac{1}{2} a \Delta t^2$$

$$x_f = \frac{1}{2} a \Delta t^2$$

$$a = \frac{2x_f}{\Delta t^2} = \frac{2(.16 \text{ m})}{(0.10 \text{ s})^2} = \sqrt{32 \text{ m/s}^2}$$