

Name : Solution

Id :

Sec. # :

An 80 kg man wants to climb a mountain and he wants to do work that is equivalent to a piece of chocolate cake rated at 700 (food) Calories. How high must the man climb? (Recall that 1 food Calorie = 1000 cal and 1 cal = 4.186 J)

The amount of energy in the chocolate cake

$$\begin{aligned} \text{cake} &= 700 \text{ Cal} \times \frac{10^3 \text{ cal}}{\text{Cal}} \times 4.186 \frac{\text{J}}{\text{cal}} \\ &= 2.93 \times 10^6 \text{ J} \end{aligned}$$

The work  $W$  that should be done by the man

$$\begin{aligned} W &= mgh = 2.93 \times 10^6 \text{ J} \\ \Rightarrow 80 \times 9.8 \times h &= 2.93 \times 10^6 \end{aligned}$$

$$\Rightarrow h = \frac{2.93 \times 10^6}{80 \times 9.8}$$

$$\Rightarrow \boxed{h = 3.74 \times 10^3 \text{ m}}$$