Answer on Question 68093, Physics, Mechanics, Relativity

Question:

During a bout with the flu an 80 kg man ran a fever of 39.0℃ (102.2°F) instead of the normal body is temperature of 37.0℃ (98.6°F)).Assuming that the human body is mostly water, how much heat is required to raise his temperature by that amount?

Solution:

We can find how much heat is required to raise the temperature of the human body by 2.0℃ from the formula:

$$Q = mc\Delta t,$$

here, $m = 80\ kg$ is the mass of the man, $c = 4190\ J/kg \cdot ℃$ is the specific heat capacity of the water (since the human body is mostly the water) and Δt is the change in the temperature.

Then, we get:

$$Q = mc\Delta t = 80\ kg \cdot 4190\ \frac{J}{kg \cdot ℃} \cdot (39.0℃ - 37.0℃) = 6.7 \cdot 10^5\ J.$$

Answer:

$Q = 6.7 \cdot 10^5\ J.$