Answer on Question #56088, Physics / Other

Energy from the Sun arrives at the top of the Earth's atmosphere with an intensity of 1.36 kW / m2. How long does it take for 2.75 × 109 J to arrive on an area of 3.75 m2?

Solution

The energy that arrives to the specific area is defined as radiating power multiplied by time:

$$E = PT \tag{1}$$

At the same time, the power of radiating delivered to specific area is equal to intensity per square unit multiplied by the area:

$$P = pA \tag{2}$$

Combining (1) and (2):

$$E = pAT \tag{3}$$

Solving (3) for T, one can define the time requested:

$$T = \frac{E}{pA};$$

$$T = \frac{2.75\times10^{9}}{1.36\times10^{3}3.75} = 5.4\times10^{5}\ \text{s}$$

Answer: 5.4×10^{5} s.