Task A.1 240979

$m = 60kg$

$\rho = 1000\ kg/m^3$ / $c = 4200\ J/kg-K$

1) $\frac{dQ}{dt} = e\sigma A T^4 \rightarrow (2.728)^4$

(e = 1 (ideal given), σ → Stefan's const.)

$Vol = \frac{m}{\rho} = \frac{60}{1000} = 0.06\ m^3 = \frac{4}{3}\pi r^3$

$\Rightarrow r = 0.242859\ m$

$A = 4\pi r^2 = 0.741170783\ m^2$

$\Rightarrow \frac{dQ}{dt} = (1)(5.67 \times 10^{-8})(A)(2.728)^4$

$= 2.8274 \times 10^{-6}$ Watt

2) avg. microwave λ be 0.01 m.

$$\text{no. of photon per second} = \frac{\left(\frac{dQ}{dt}\right)\lambda}{hc}$$

$$= \frac{(2.8274 \times 10^{-6})(0.01)}{(6.626 \times 10^{-34})(3 \times 10^8)}$$

$= 0.11708 \times 10^{18} = [1.1708 \times 10^{17}]$

3) Energy given in time (t):

$$\left(\frac{dQ}{dt}\right) t = m L \Delta T$$

$$t = \frac{(60)(4200)(1)}{2.3274 \times 10^{-6}}$$

$$= 108.27 \times 10^{9}$$

$$= 1.0827 \times 10^{11} \text{ sec}$$

(4+5)