1.

Luft Temperaturen i svømmehall burde vaere høyere enn temperaturen i vannbassengen

Ved høyere temperatur øker metningstettheten av vanndamp. Og det er mindre kondensø.

2. Varme maskin syklus

$Q = 2.56 \times 10^6$ J varme inn i motor

$W = 1.50 \times 10^5$ J arbeid ut fra motor

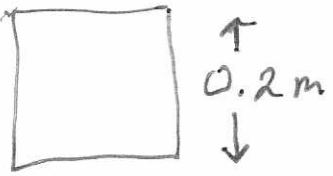
a) $\eta = \frac{\text{arbeid}}{\text{input}} = \frac{W}{Q} = \frac{1.50 \times 10^5 \text{ J}}{2.56 \times 10^6 \text{ J}} = 0.059 = 5.9\%$

b) $W = Q_h - Q_c$ for syklus motor

$Q_c = Q_h - W$

$= 2.56 \times 10^6 \text{ J} - 1.50 \times 10^5 \text{ J} = 2.41 \times 10^6 \text{ J}$

3. Plate



$A = (0.2m)^2 = 0.04 m^2$

one side of plate

Heat from Both sides: $A = 2 \cdot (0.04 m^2) = 0.08 m^2$

$e = 1.0$ $\quad h = 6\ W/(m^2 K^4)$

$\sigma = 5.67 \times 10^{-8}\ J/(s m^2 K^4)$

$T_p = 900^\circ C = 1173\ K$ Temperature of plate

$T_R = 20^\circ C = 293\ K$ Temperatur of Room

a) energy from Radiation/strahling

$$\dot{Q} = Q/_{time} = \sigma e A (T_p^4 - T_R^4)$$

$$\dot{Q} = 5.67 \times 10^{-8}\ J/(s \cdot m^2 K^4)\ 1.0\ (0.08 m^2)\left((1173K)^4 - (293K)^4\right)$$

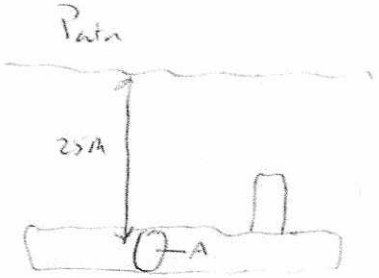
$$= 8.55\ kW$$

b) energy From convection

$$\dot{Q} = h A \Delta T = 6\ W/(m^2 K) \cdot 0.08 m^2 \cdot (1173 - 293) K$$

$$= 422 W = 0.422\ kW$$

4. submarine 25 m under surface



$d = 0.450m$

$A = \pi\left(\frac{d}{2}\right)^2$

$\rho_w = 10^3 kg/m^3$

$g = 9.8 m/s^2$

$h = 25.0 m$

Pressure on door / Hatch

$P_w = P_{atm} + \rho g h$ from water

$P_{air} = P_{atm}$ from air inside submarine

Total force

$F = (P_w - P_{air}) \cdot A$

$= (P_{atm} + \rho g h - P_{atm}) \cdot A$

$F = \rho g h A = 10^3 kg/m^3 \; 9.8 m/s^2 \; 25.0m \; \pi\left(\frac{0.450m}{2}\right)^2$

$= 39.0 \times 10^3 N = 3.90 \times 10^4 N$