

$$Q = c \cdot m \cdot \Delta\theta = c \cdot m \cdot \Delta T \quad \dot{Q} = c \cdot \dot{m}$$

$$Q = \dot{Q} \cdot \Delta\theta = \dot{Q} \cdot \Delta T \quad P = \frac{Q}{\Delta t}$$

Oef 1 p. 174

a) FOUT  $Q = c \cdot m \cdot \Delta T \Rightarrow \Delta T = \frac{Q}{c \cdot m} \Rightarrow \Delta T \sim \frac{1}{c}$

b)

c)  $c_{OLIE} = 2000 \frac{J}{kg \cdot K}$   $\Delta T = 1 K$   $V_{OLIE} = 1 \cdot 10^{-3} m^3$   
 $\rho_{OLIE} \approx 900 \frac{kg}{m^3}$

$$Q = c_{OLIE} \cdot m_{OLIE} \cdot \Delta T = c_{OLIE} \cdot \rho_{OLIE} \cdot V_{OLIE} \cdot \Delta T =$$

$$= 2000 \frac{J}{kg \cdot K} \cdot 900 \frac{kg}{m^3} \cdot 1 \cdot 10^{-3} m^3 \cdot 1 K$$

d)

e)  $c_{AL} = 899 \frac{J}{kg \cdot ^\circ C} \approx 900 \frac{J}{kg \cdot ^\circ C}$   $m = 2 kg$   $\Delta T = 2 K$   $Q = 1800 J$  ?  
 $\dot{Q} = 1800 J \neq 2000 kJ \Rightarrow FOUT$

$$Q = c_{AL} \cdot m_{AL} \cdot \Delta T \approx 3600 J \Rightarrow FOUT$$

f)

Oef 4 p. 174

$$Q = c \cdot m \cdot \Delta\theta \Rightarrow \Delta\theta = \frac{Q}{c \cdot m}$$

↗ afh. van  $x$ -as

↘  $\Delta\theta$  is afh. van  $c$  en  $m$

$$\Rightarrow \text{geen uitkomst} \Rightarrow c$$



Oef 8 p. 175 ZELF: 1 → 22 in T8 1, 5, 7, 11, 20

geg:  $C_g = 172 \frac{\text{J}}{^\circ\text{C}}$   $m_w = 0,210 \text{ kg}$   $C_w = 4186 \frac{\text{J}}{\text{kg} \cdot ^\circ\text{C}}$

gev:  $C_{\text{TOT}}$ ,  $m_g$

$C_g = 837 \frac{\text{J}}{\text{kg} \cdot ^\circ\text{C}}$

opl: a)  $C_{\text{TOT}} = C_g + C_w = C_g + C_w \cdot m_w = 172 \frac{\text{J}}{^\circ\text{C}} + 4186 \frac{\text{J}}{\text{kg} \cdot ^\circ\text{C}} \cdot 0,21$

$= 172 \frac{\text{J}}{^\circ\text{C}} + 879 \frac{\text{J}}{^\circ\text{C}} = 1051 \frac{\text{J}}{^\circ\text{C}}$

b)  $C_g = C_g \cdot m_g \Rightarrow m_g = \frac{C_g}{C_g} = \frac{172 \frac{\text{J}}{^\circ\text{C}}}{837 \frac{\text{J}}{\text{kg} \cdot ^\circ\text{C}}} = 0,205 \text{ kg}$

Oef 9 p. 175

geg:  $m = 2,50 \text{ kg}$   $\theta_b = -8,0^\circ\text{C} \Rightarrow T_b = 265,2 \text{ K}$   $C_{\text{ys}} = 2090 \frac{\text{J}}{\text{kg} \cdot ^\circ\text{C}}$   
 $\theta_e = -3,0^\circ\text{C} \Rightarrow T_e = 270,2 \text{ K}$

gev:  $Q$

opl:  $Q = C \cdot m \cdot \Delta\theta = 2090 \frac{\text{J}}{\text{kg} \cdot ^\circ\text{C}} \cdot 2,50 \text{ kg} \cdot 5,0^\circ\text{C} = 2,6 \cdot 10^4 \text{ J}$

Oef 14 p. 175

geg:  $m_p = 0,560 \text{ kg}$   $C_p = 460 \frac{\text{J}}{\text{kg} \cdot ^\circ\text{C}}$   $V_w = 2,6 \cdot 10^{-3} \text{ m}^3 = 2,6 \text{ l}$   $\theta_b = 18^\circ\text{C}$   $\theta_k = 100^\circ\text{C}$   
 $C_w = 4186 \frac{\text{J}}{\text{kg} \cdot ^\circ\text{C}}$   $P = 80 \cdot 10^3 \text{ W}$   
 $\Delta\theta = 82^\circ\text{C}$   
 $m_w = 2,6 \text{ kg}$

gev:  $\Delta t$ ,  $\frac{Q_p}{Q_{\text{TOT}}}$

opl: a)  $P_{\text{TOT}} = \frac{Q_{\text{TOT}}}{\Delta t} \Rightarrow \Delta t = \frac{Q_{\text{TOT}}}{P_{\text{TOT}}} = \frac{Q_p + Q_w}{P_{\text{TOT}}} = \frac{C_p \cdot m_p \cdot \Delta\theta + C_w \cdot m_w \cdot \Delta\theta}{P_{\text{TOT}}}$   
 $= 10,1 \text{ s} = 10 \cdot 10^{-1} \text{ s}$

b)  $\frac{Q_p}{Q_{\text{TOT}}} = \frac{C_p \cdot m_p \cdot \Delta\theta}{C_p \cdot m_p \cdot \Delta\theta + C_w \cdot m_w \cdot \Delta\theta} = \frac{C_p \cdot m_p}{C_p \cdot m_p + C_w \cdot m_w} = 0,026 = 2,6 \%$