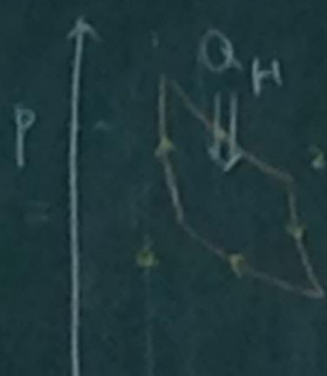
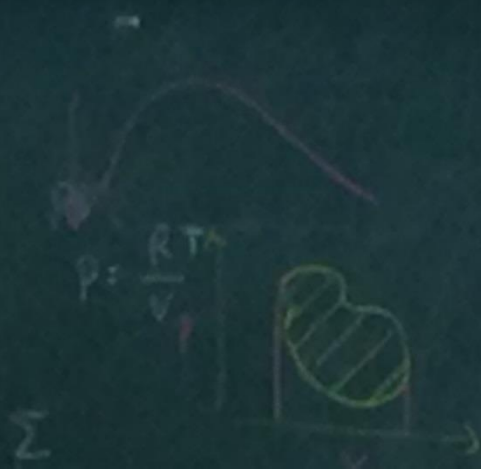


entropy

$$S = k \ln \Omega$$

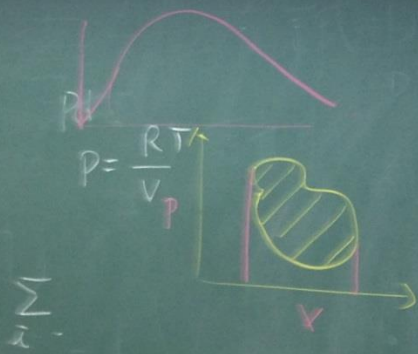
$$\Delta Q = c m \Delta T$$



$$PV^\gamma = \text{常数}$$

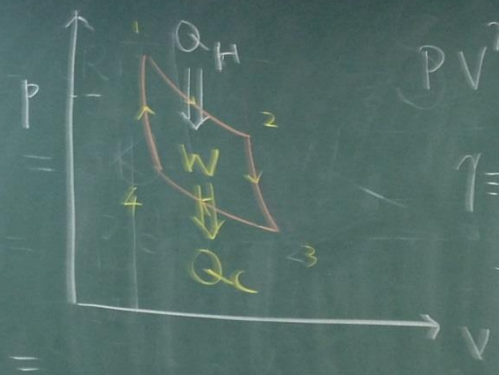
$$\frac{c_p}{c_v} = \gamma$$

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$$\sum \frac{1}{T}$$

$$\Delta S =$$



$$PV^\gamma = \text{常数}$$

$$\gamma = \frac{C_p}{C_v} = \frac{C_v + R}{C_v}$$

$$dQ = dU + PdW$$

$1 \rightarrow 2$	$v_1 \rightarrow v_2$	$Q_H = RT_H \ln v_2/v_1$
$2 \rightarrow 3$	$P_2 v_2^\gamma = P_3 v_3^\gamma$	
$3 \rightarrow 4$	$v_3 \rightarrow v_4$	$Q_C = RT_C \ln v_4/v_3$
$4 \rightarrow 1$	$P_4 v_4^\gamma = P_1 v_1^\gamma$	

$$T dS = dQ$$

$$dS = \frac{dQ}{T}$$

$$0.46 \text{ kcal/K}$$

$$dS = \frac{dQ}{T}$$

$$800 \text{ J/K}$$

$$\Delta S_{Fe} = \int \frac{dQ}{T} = m C_{Fe} \int_{T_0}^{T_1} \frac{dT}{T}$$

$$= -0.35 \text{ kcal/K}$$

$$= -1100 \text{ J/K}$$

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$$PV = nRT$$

V	V
---	---

$$\frac{1}{2} m \langle v^2 \rangle = \frac{3}{2} RT$$

$$T dS = dQ$$

$$dS = \frac{dQ}{T}$$

$$dS = \frac{dq}{T}$$

$$2.46 \text{ kJ/K}$$

$$800 \text{ J/K}$$

$$\Delta S_{Fe} = \int \frac{dq}{T} = m C_{Fe} \int \frac{dT}{T}$$

$$= -0.25 \text{ kJ/K}$$

$$= -1100 \text{ J/K}$$

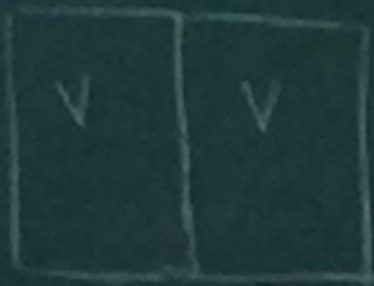
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$$\frac{1}{2} n \langle U \rangle = \frac{1}{2} n R T$$

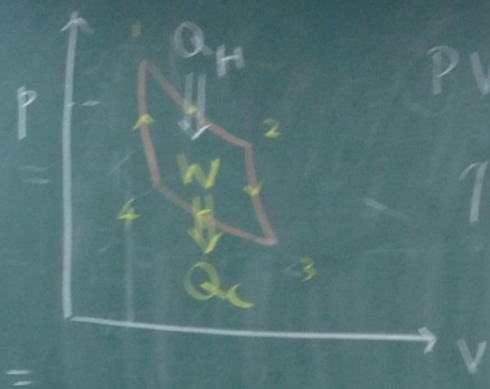
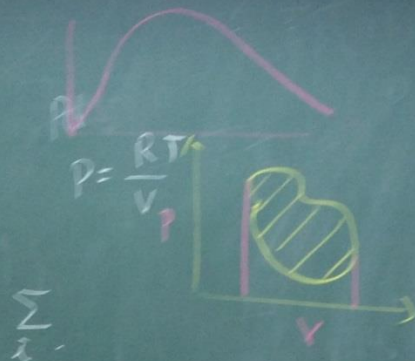
$$PV = nRT$$

$$\Delta Q = \Delta U + \Delta W$$



$$C_{Fe} = 0.11 \text{ kJ/kg}\cdot\text{K}$$

$$\Delta Q = 132 \text{ kJ}$$



$PV^\gamma = \text{常数}$

$\gamma = \frac{C_p}{C_v}$   
 $= \frac{C_v + R}{C_v}$

$dQ = dU + PdW$

$1 \rightarrow 2 \quad v_1 \rightarrow v_2 \quad Q_H = RT_H \ln v_2/v_1$   
 $2 \rightarrow 3 \quad P_2 v_2^\gamma = P_3 v_3^\gamma \quad Q_C = RT_L \ln v_4/v_3$   
 $3 \rightarrow 4 \quad v_3 \rightarrow v_4$   
 $4 \rightarrow 1 \quad P_4 v_4^\gamma = P_1 v_1^\gamma$   
 $P_1 v_1 = nRT_H \quad \frac{P_1}{P_2} = \frac{v_2}{v_1}$   
 $P_2 v_2 = nRT_L \quad \frac{P_1}{P_2} = \frac{v_2}{v_1}$

$\left(\frac{P_1}{P_2}\right) \left(\frac{v_4}{v_3}\right)^\gamma = \left(\frac{P_1}{P_2}\right) \left(\frac{v_1}{v_2}\right)^\gamma$

$$\frac{1}{2} m \langle v^2 \rangle = \frac{3}{2} R T$$

$$e = \frac{|W|}{Q_H} = \frac{Q_H - |Q_L|}{Q_H} = 1 - \frac{|Q_L|}{Q_H} = 1 - \frac{T_L}{T_H}$$

$$\frac{R T_H \ln v_2/v_1 - R T_L \ln v_4/v_3}{R T_H \ln v_2/v_1} = 1 - \frac{T_L}{T_H}$$