


PHYS1013


Energy and Matter

$U_i (n_i, P_i, V_i, \dots)$ $U_f (n_f, P_f, V_f, \dots)$ $W = -nRT \int_{V_i}^{V_f} \frac{dV}{V} = -nRT \ln\left(\frac{V_f}{V_i}\right)$ $H = U + pV$ $T(K) = T(^{\circ}C) + 273.15$
 $dH = dU + d(pV)$ $dH = dU + p dV + V dp$ $C_p = (\Delta H / \Delta T)_p$ $\Delta U = Q - W$ $\Delta S = nRT \ln\left(\frac{V_f}{V_i}\right)$
 $dU = dq + dw$ $dH = dq - p dV + V dp$ $C_p = \left(\frac{\partial H}{\partial T}\right)_p$ $W = P \Delta U$ $W = \int_{V_1}^{V_2} P dV$
 $H = U + P V$ $dH = C_p dT$ $\Delta H = q_p = C_p \Delta T$ $C_v = (\Delta U / \Delta T)_v$ $ds \geq \frac{dq}{T}$
 $dw = -p dV$ $\Delta S = \frac{\Delta_{\text{trans}} H}{T}$ $ds = \frac{dq_{\text{rev}}}{T}$ $\Delta S = \int_1^f \frac{dq_{\text{rev}}}{T}$
 $C_v = \left(\frac{\partial U}{\partial T}\right)_v$ $ds \geq \frac{dq}{T}$



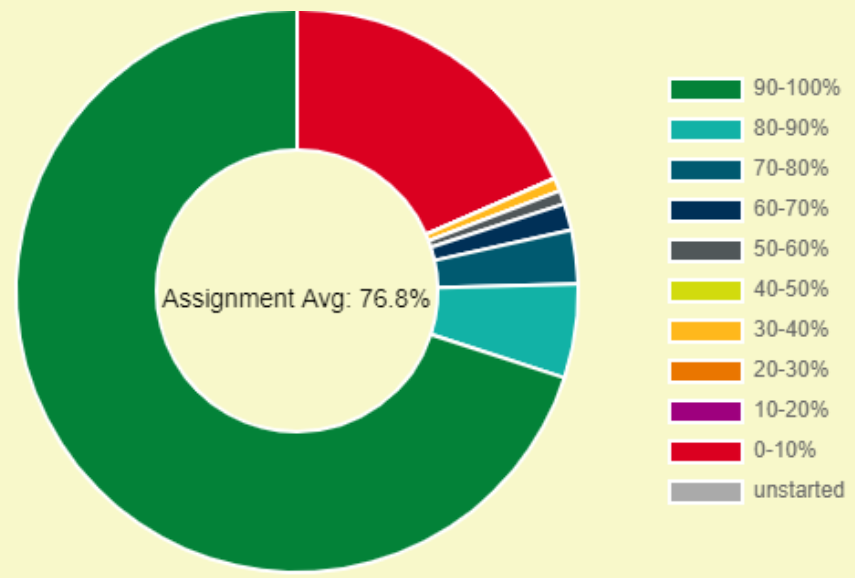
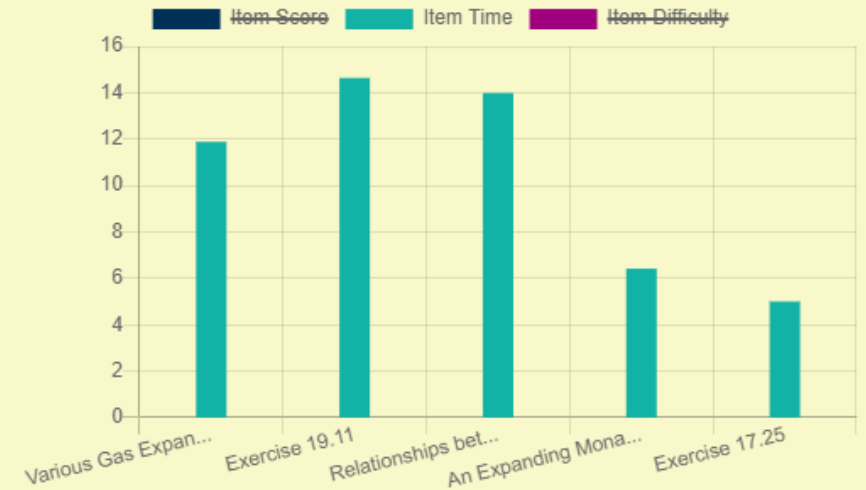
Thermodynamics

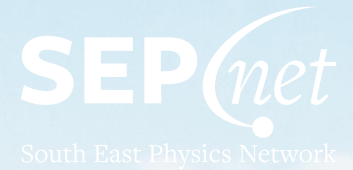
$\Delta U = m(u_2 - u_1) \Delta KE$
 $= \frac{1}{2} m (v_2^2 - v_1^2) \Delta PE$
 $= mg(z_2 - z_1)$


 $W_b = \frac{P_1 V_1 - P_2 V_2}{1 - \gamma}$ $\eta_{th} = \frac{W_{net}}{Q_{in}} = 1 - \frac{Q_{out}}{Q_{in}}$
 $dH = dq + V dp$ $\Delta H = \Delta U + V \Delta p$ $Q = \Delta U + P \Delta V$
 $dH = (dq)_p$ $\Delta H = q_p$ $T_R = \frac{T}{T_c}$ $dU = C_v dT$ $\Delta U = q_v = C_v \Delta T$
 $dU = (dq)_v$ $\Delta U = q_v$ $\Delta U = U_f - U_i = q(\text{heat}) + w(\text{work})$
 $P_R = \frac{P}{P_{cr}}$ $W_b = P_1 V_1 \ln \frac{V_2}{V_1}$ $= P_1 V_1 \ln \frac{P_1}{P_2} = RT_1 \ln \frac{P_1}{P_2}$ $x = \frac{mg}{m_f + mg}$ $\eta_k = \frac{p_{cr}}{RT_{cr}}$

MP Week 5 - average score 76.6%

Average time
52 min





Physics Careers

Teaching—Research—Industry
Which is right for you?

20th March 2024 14:00 - 16:00 67/1037

With representatives from: Ark Teacher Training, IOP, PGCE @ Soton, Teach First, Winchester Science Centre, Physics based PhDs around the University, UKAEA, Thales, Triumph Lasers, Xylem/Sentex, and more.

With Q&A and networking!

Register: <https://tinyurl.com/24wzchar>

