Kerry Kelly . . . Quiz 5

1.) $m = 5\ kg$ $\quad m\Delta u = Q + W_{EC}$ $\quad V_2 = V_1$

$-\int P dv$ $\quad PV = nRT$ $\quad \frac{RV_1}{T_1} = \frac{RV_2}{T_2}$ $\quad \frac{V_1}{T_1} = \frac{V_2}{T_2}$

$-\int P dv = P\Delta v \rightarrow -P(V_2 - V_1) = 0$

System not expanding

2.) $m = 1\ kg$ $\quad P_1 = P_2 = 1\ MPa$

$T_1 = 600°C$ $\quad T_2 = 200°C$

$m(\Delta u + \frac{v^2}{2} + gz) = Q + W_{EC} + W_S$ $\quad \therefore \Delta u = Q + W_{EC}$

$\Delta H - \Delta(PV) = Q + W_{EC}$

$\Delta H = \Delta u + \Delta(PV)$

~~$u_1 = 3297.5\ \frac{kJ}{kg}$~~ $\quad u_2 = 2622.2$

~~$v_1 = 0.4011\ \frac{m^3}{kg}$~~ $\quad v_2 = 0.206$

$H_2 = 3698.6$

$H_1 = +2828.3$ $\quad H_2 - H_1$

3.) $\dot{W}_{flow} = \dot{m}PV = \frac{Av}{X} \cdot PX$ $\quad \therefore \dot{W}_{flow} = AvP$ $\quad v = \frac{\dot{W}_{flow}}{AP}$

$\rho = \frac{1000\ kg}{m^3}$ $\quad \therefore \dot{m} = \frac{0.5\ m^3}{s} \times \frac{1000\ kg}{m^3} = 500\ \frac{kg}{s}$

$\dot{W}_{flow} = \dot{m}PV = 500\ \frac{kg}{s} \cdot \pi(0.125)^2 \cdot P = 24.5P$

$v = \frac{24.5P}{AP}$