(AU1) (2009 4.2)

a) m, d , ϵ_d $\mu(T)$, $n_d(T)$ $Z_1 = Z_{1,id} \cdot e^{+\beta\epsilon_d}$

$$\mathcal{H} = \frac{p^2}{2m} - \epsilon_d \rightarrow Z = e^{+\beta\epsilon_d N} \cdot Z_{ideal}$$

$$\rightarrow F = F_{id} - \epsilon_d N$$

$$\rightarrow \mu = \mu_{id} - \epsilon_d = \frac{\partial F}{\partial N} =$$

$$= kT\ln(n_d\lambda^d) - \epsilon_d$$

b) $n_2(n_3) = ?$

$\mu_{surface} = \mu_{id}^{2D} + \epsilon_0$ $\mu_{solution} = \mu_{id}^{3D}$

$\mu_{surface} = \mu_{solution}$

$$\rightarrow kT\ln(n_{surface} \cdot \lambda^2) - \epsilon_0 = kT\ln(n_{sol} \cdot \lambda^3)$$

$$\ln\left(\frac{n_{sur}}{n_{sol}\cdot\lambda}\right) = \frac{+\epsilon_0}{kT} \rightarrow n_{surface} = (n_{sol}\cdot\lambda)\cdot e^{+\frac{\epsilon_0}{kT}}$$

c) To individual polymers: $n_{polymer} = (n_{sol}\cdot\lambda^2)\, e^{+\frac{\epsilon_0}{kT}}$

To a f-dimensional gel: $n_{gel} = (n_{sol}\cdot\lambda^{(3-f)})\, e^{+\frac{\epsilon_0}{kT}}$

$$\rightarrow \frac{n_{pol}}{n_{gel}} = \lambda^{f-1} \sim T^{\left(\frac{1-f}{2}\right)}$$