CPS Questions: Nernst equation

Notes on General Chemistry

http://quantum.bu.edu/notes/GeneralChemistry/CPSNernstEquation.pdf
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1. We have derived that $\mathcal{E} = \mathcal{E}^\circ - (\text{mol}\, R\, T)/(n_e\, \mathcal{F}) \ln(Q)$. What is the value of $\mathcal{E}$ when everything is in standard states?

$\mathcal{E} = \infty$ $\mathcal{E} = 0$ $\mathcal{E} = \mathcal{E}^\circ$ None of these

2. We have derived that $\mathcal{E} = \mathcal{E}^\circ - (\text{mol}\, R\, T)/(n_e\, \mathcal{F}) \ln(Q)$. What is the value of $\mathcal{E}$ when everything is at equilibrium?

$\mathcal{E} = \infty$ $\mathcal{E} = 0$ $\mathcal{E} = \mathcal{E}^\circ$ None of these

3. We have derived that $\mathcal{E} = \mathcal{E}^\circ - (\text{mol}\, R\, T)/(n_e\, \mathcal{F}) \ln(Q)$. What is the value of $\mathcal{E}$ when there are *no products* present?

$\mathcal{E} = \infty$ $\mathcal{E} = 0$ $\mathcal{E} = \mathcal{E}^\circ$ None of these

4. We have derived that $\mathcal{E} = \mathcal{E}^\circ - (\text{mol}\, R\, T)/(n_e\, \mathcal{F}) \ln(Q)$. What is the value of $\mathcal{E}$ when there are *only products* present?

$\mathcal{E} = \infty$ $\mathcal{E} = 0$ $\mathcal{E} = \mathcal{E}^\circ$ None of these

5. At 25 °C, $\mathcal{E} = \mathcal{E}^\circ - (0.06/n_e)\ \text{V} \log(Q)$. What is the expression for $\mathcal{E}^\circ$ at 25 °C?

$\mathcal{E}^\circ = (0.06/n_e)\ \text{V} \log(Q)$ $\mathcal{E}^\circ = (0.06/n_e)\ \text{V} \log(K)$ $\mathcal{E}^\circ = \mathcal{E}$ None of these

6. For A + B ⇄ C + D, $\Delta G^\circ = -\text{mol}\, R\, T \ln(Q)$. What is the value of ΔG° for 2 A + 2 B ⇄ 2 C + 2 D?

$2\,\Delta G^\circ$ ΔG° $\Delta G^\circ/2$ None of these

7. For A + B ⇄ C + D, $\mathcal{E}^\circ = (0.06/n_e)\ \text{V} \log(K)$. What is the value of $\mathcal{E}^\circ$ for 2 A + 2 B ⇄ 2 C + 2 D?

$2\,\mathcal{E}^\circ$ $\mathcal{E}^\circ$ $\mathcal{E}^\circ/2$ None of these

8. For A + B ⇄ C + D, $\mathcal{E}^\circ = (0.06/n_e)\ \text{V} \log(K)$. What is the value of $\mathcal{E}^\circ$ when all of the concentrations are doubled?

$2\,\mathcal{E}^\circ$ $\mathcal{E}^\circ$ $\mathcal{E}^\circ/2$ None of these

9. For A + B ⇄ C + D, $\mathcal{E}^\circ = 1.50$ V and $n_e = 2$. What is the value K for the process?

$K = 10^{-3}$ $K = 10^{50}$ $K = 10^{3}$ None of these

10. For 2 A + 2 B ⇄ 2 C + 2 D, $\mathcal{E}^\circ = 1.50$ V and $n_e = 4$. What is the value K for the process?

$K = 10^{100}$ $K = 10^{50}$ $K = 2 \times 10^{3}$ None of these

11. For A + B ⇄ C + D, $n_e = 3$. At 25 °C, $\mathcal{E}^\circ = 1.50$ V and when $Q = Q_1$, $\mathcal{E} = \mathcal{E}_1 = 2.00$ V. This means …

$Q_1 > K$ $Q_1 = K$ $Q_1 = 1$ $Q_1 < 1$

12. For A + B ⇄ C + D, $n_e = 3$. At 25 °C, $\mathcal{E}° = 1.50$ V and when $Q = Q_1$, $\mathcal{E} = \mathcal{E}_1 = 2.00$ V. When the concentrations of C and D are each tripled, Q is now …

$3\,Q_1$ $9\,Q_1$ $(Q_1)^3$ $(3\,Q_1)^3$

13. For A + B ⇄ C + D, $n_e = 3$. At 25 °C, $\mathcal{E}° = 1.50$ V and when $Q = Q_1$, $\mathcal{E} = \mathcal{E}_1 = 2.00$ V. When the concentrations of C and D are each tripled, $\mathcal{E}$ will be …

> 2.00 V $= 2.00$ V < 2.00 V Not enough information

14. For A + B ⇄ C + D, $n_e = 3$. At 25 °C, $\mathcal{E}° = 1.50$ V and when $Q = Q_1$, $\mathcal{E} = \mathcal{E}_1 = 2.00$ V. When the concentrations of C and D are each tripled, $\mathcal{E}$ will be …

1.98 V 1.52 V 1.48 V None of these