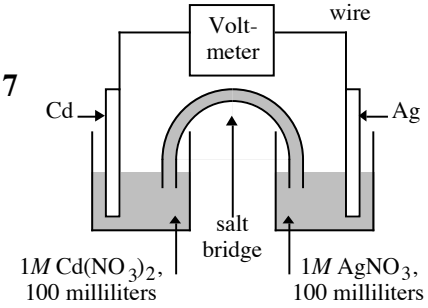
AP Chemistry
Oceana H.S.

Name_____

AP MULTIPLE CHOICE QUESTIONS
CH. 20, SET 1

1984
Questions 14 – 17



The spontaneous reaction that occurs when the cell above operates is

$2Ag^+ + Cd\ (s) \rightarrow 2Ag\ (s) + Cd^{2+}$

(A) Voltage increases.
(B) Voltage decreases but remains at zero.
(C) Voltage becomes zero and remains at zero.
(D) No change in voltage occurs.
(E) Direction of voltage change cannot be predicted without additional information.

Which of the above occurs for each of the following circumstances?

14. A 50-milliliter sample of a 2-molar $Cd(NO_3)_2$ solution is added to the left beaker.
15. The silver electrode is made larger.
16. The salt bridge is replaced by a platinum wire.
17. Current is allowed to flow for 5 minutes.

29. $Cu\ (s) + 2Ag^+ \Leftrightarrow Cu^{2+} + 2Ag\ (s)$

If the equilibrium constant for the reaction above is 3.7×10^{15}, which of the following correctly describes the standard voltage, E^o, and the standard free energy change, ΔG^o, for this reaction?

(A) E^o is positive and ΔG^o is negative.
(B) E^o is negative and ΔG^o is positive.
(C) E^o and ΔG^o are both positive.
(D) E^o and ΔG^o are both negative.
(E) E^o and ΔG^o are both zero.

34. $\_\_\_CrO_2^- + \_\_\_OH^- \rightarrow \_\_\_CrO_4^{2-} + \_\_\_H_2O + \_\_\_e^-$

When the equation for the half reaction above is balanced, what is the ratio of the coefficients OH^-/CrO_2^-?

(A) 1:1 (B) 2:1 (C) 3:1 (D) 4:1 (E) 5:1

46. If 0.060 faraday is passed through an electrolytic cell containing a solution of In^{3+} ions, the maximum number of moles of In that could be deposited at the cathode is

(A) 0.010 mole (B) 0.020 mole (C) 0.030 mole (D) 0.060 mole (E) 0.18 mole

57. For the reaction

$A\ (g) \Leftrightarrow B\ (g) + C\ (g)$

the equilibrium constant, K_p, is 2×10^{-4} at 25°C. A mixture of the three gases at 25°C is placed in a reaction flask and the initial pressures are $P_A = 21$ atm, $P_B = 0.5$ atm, and $P_C = 1$ atm. At the instant of mixing, which of the following is true for the reaction as written?

(A) $\Delta G < 0$ (B) $\Delta G > 0$ (C) $\Delta S = 0$ (D) $\Delta G^o = 0$ (E) $\Delta G^o < 0$

1994

$2H_2O + 4MnO_4^- + 3ClO_2^- \rightarrow 4MnO_2 + 3ClO_4^- + 4OH^-$

18. Which species acts as an oxidizing agent in the reaction represented above?

(A) H_2O (B) ClO_4^- (C) ClO_2^- (D) MnO_2 (E) MnO_4^-