Competitive Exams: Chemistry MCQs (Practice-Test 10 of 31)

1. In recitation, you studied the electrochemistry involved in the “fruit clock” If an orange is used to power the fruit clock, which of the following statements is TRUE?

    a. Free electrons flow through the orange to maintain electrical neutrality.

    b. The orange allows the Zn2 + and Cu2 + ions produced in the reaction to mix thereby maintaining electrical neutrality.

    c. The orange functions as the anode.

    d. The orange functions as the salt bridge by maintaining electrical neutrality.

    e. The acids present in the orange are oxidized at the anode to produce hydrogen gas.

2. Which of the following reactions IS a reduction-oxidation reaction?

    a. formation of N2 in automobile airbags: 2NaN3 (s) → 2Na (l) + 3N2 (g)

    b. combustion of propane in a gas grill: C3H8 (g) + 5O2 (g) → 3CO2 (g) + 4H2O (g)

    c. decomposition of hydrogen peroxide (H2O2) by light: 2H2O2 (aq) → 2H2O (l) + O2 (g)

    d. All of these are reduction-oxidation reactions.

    e. None of these are reduction-oxidation reactions.

3. Which of the following metals could be used successfully to galvanize iron?

    a. Ni

    b. Cu

    c. Sn

    d. Co

    e. Mn

4. Calculate the standard cell potential (in V) for the following reaction at 25oC. 2Cr (s) + 3Ni2 + (aq) → 2Cr3 + (aq) + 3Ni (s)

5. The layer of zinc on a piece of galvanized iron can be removed by placing it in a concentrated solution of acid. Calculate the standard cell potential (in V) for this reaction.

6. A beaker contains a small amount of gold dust (Au (s)). Which of the following aqueous solutions, when added to the beaker, would dissolve the gold dust (i.e.. convert Au (s) to Au3 + (aq))?

    a. Cr2O72- (acidic solution)

    b. H2O2 (acidic solution)

    c. Br2

    d. Zn2 +

    e. Al3 +

7. Which of the following statements best describes what will happen when liquid bromine (Br2) is poured into a beaker containing aluminum metal?

    a. Br2 will be reduced; Al will be oxidized

    b. Br2 will be oxidized; Al will be reduced

    c. Br2 will function as the reducing agent; Al will function as the oxidizing agent

    d. A reaction will not occur.

    e. It is impossible to tell.

8. Consider the following galvanic cell reaction at 25oC, 4Cr2 + (aq) + O2 (g) + 4H3O + (aq) → 4Cr3 + (aq) + 6H2O (l) Which of the following statements best describes what would happen to the cell potential if the concentration of Cr2 + is increased?

    a. The cell potential would become less positive.

    b. The cell potential would become more positive.

    c. The cell potential would remain the same.

    d. It is impossible to tell.

9. Which of the following half-reactions is involved in the STANDARD HYDROGEN ELECTRODE?

    a. Pt2 + (aq) + 2e_____> Pt (s)

    b. 2H3O + (aq) + 2e_____> 2H2O (l) + H2 (g)

    c. H2O2 (aq) + 2H3O + (aq) + 2e_____> 4H2O (l)

    d. O2 (g) + 2H2O (l) + 4e_____> 4OH- (aq)

    e. None of the above:

10. A concentration cell containing aqueous solutions of Cu (NO3) 2 and solid copper metal is constructed so that the Cu2 + ion concentration in the cathode half-cell is 0.66 M. Calculate the concentration of the Cu2 + ion in the anode half-cell if the cell potential for the concentration cell at 250C is 0.034 V.

11. Consider a galvanic cell based on the following overall reaction, Fe (s) + 2Ag + (aq) → Fe2 + (aq) + 2Ag (s) Calculate the cell potential (in V) for this reaction at 250C when the concentration of Ag + ions is 0.050 M and the concentration of Fe2 + ions is 1.50 M.

12. Which of the following metal ions will plate out on a piece of galvanized iron which has NOT had the layer of Zn metal removed?

    a. Cu2 +

    b. Au3 +

    c. Ni2 +

    d. All of these.

    e. None of these.

13. Which of the following best explains why concentration cells must be run under non-standard conditions in order for them to do electrical work?

    a. A concentration cell can only do electrical work when either NH3 or NaOH is added to one of the half-cells.

    b. A concentration cell cannot do electrical work at 250C.

    c. The change in free energy for a concentration cell is always negative under standard conditions.

    d. A concentration cell has a cell potential equal to zero under standard conditions.

    e. A concentration cell can only do electrical work when the cell is run under standard conditions.

14. Which of the following statements about a salt bridge in a voltaic cell is TRUE?

    a. Free electrons flow through the salt bridge to maintain electrical neutrality in the two half-cells.

    b. The salt bridge allows the ions present in the two half-cells to mix extensively.

    c. The wire must be connected directly to the salt bridge in order for the salt bridge to be able to maintain electrical neutrality in the two half-cells.

    d. In some cases, a salt bridge functions as the anode.

e. Ions from the electrolyte in the salt bridge flow into each half-cell to maintain electrical neutrality.

15. Which of the following reactions can be used to construct a voltaic cell?

a. $H3O + (aq) + OH- (aq) \Leftrightarrow 2H2O (l)$

b. $HF (g) + H2O (l) \Leftrightarrow H3O + (aq) + F- (aq)$

c. $Cu2 + (aq) + 4F- (aq) \Leftrightarrow CuF42- (aq)$

d. $O2 (g) + 4H3O + (aq) + 4I- (aq) \Leftrightarrow 2I2 (aq) + 6H2O (l)$

e. $2NO2$ (g, nitrogen dioxide) $\Leftrightarrow N2O4$ (g, dinitrogen tetroxide)

Discussions & Questions

Chemistry questions answers (- ra...@ on 29-Jan-2018)

1 Answer

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