Chapter Summary Worksheet

Chapter 10 Electrochemistry and redox equilibria

Print out and complete this worksheet to generate a summary for Chapter 10.

1 The oxidation number of carbon in the oxalate ion, $C_2O_4^{2-}$ is:

- ☐ **A** +4
- ☐ **B** +3
- ☐ **C** –3
- ☐ **D** –4

2 Which equation does **not** represent a redox reaction?

- ☐ **A** $TiO_2 + 2Cl_2 + C \rightarrow TiCl_4 + CO_2$
- ☐ **B** $PbO_2 + 4HCl \rightarrow PbCl_2 + 2H_2O + Cl_2$
- ☐ **C** $VO_3^- + 2H^+ \rightarrow VO_2^+ + H_2O$
- ☐ **D** $3ClO^- \rightarrow 2Cl^- + ClO_3^-$

3 Use the following standard reduction potentials to answer this question.

$Sn^{4+}(aq) + 2e^- \rightleftharpoons Sn^{2+}(aq)$ $\quad E^{\ominus} = +0.44\,V$

$Fe^{3+}(aq) + e^- \rightleftharpoons Fe^{2+}(aq)$ $\quad E^{\ominus} = +0.77\,V$

The standard cell potential for the reduction of Fe^{3+} ions by Sn^{2+} ions is:

- ☐ **A** +0.33 V
- ☐ **B** +1.10 V
- ☐ **C** +1.21 V
- ☐ **D** +1.98 V

4 When carrying out an experiment to determine the standard reduction potential of a metal such as zinc, a reference electrode is needed:

- ☐ **A** because the values are on a scale in which hydrogen is zero
- ☐ **B** to make sure that zinc is the cathode
- ☐ **C** because the reaction that takes place at the zinc electrode must be oxidation
- ☐ **D** because it is impossible to measure a potential directly

5 A reaction has a standard cell potential of +0.20 V but does not take place at room temperature. The reason for this is that:

- ☐ **A** the value of the cell potential is not large enough
- ☐ **B** the value of the cell potential should be negative so that ΔS will be positive.
- ☐ **C** the activation energy is too high
- ☐ **D** the reactants are separated by a salt bridge

6 Which is **not** a disadvantage when using hydrogen as a fuel in a fuel cell in a vehicle?

- ☐ **A** It cannot be liquefied unless cooled to a very low temperature.
- ☐ **B** Compressed gaseous hydrogen has a low energy output per cm^3.
- ☐ **C** It is flammable.
- ☐ **D** Compressed gases require heavy containers.

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