

Revised August 2009

HONORS WORKSHEET 14s: ANSWERS

1.

- (a) $\text{Fe}_{(s)} + \frac{1}{2}\text{O}_{2(g)} + \text{H}_2\text{O}_{(l)} \rightarrow \text{Fe}^{2+}_{(aq)} + 2\text{OH}^{-}_{(aq)}$
(b) +0.84 V
(c) $\text{Fe}^{2+} \rightarrow \text{Fe}^{3+} + \text{e}^{-}$

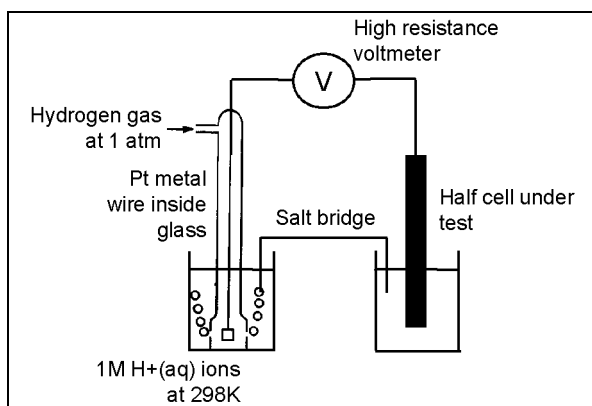
2.

- (a) $\text{Mg}_{(s)} | \text{Mg}^{2+}_{(aq)} || \text{H}^{+}_{(aq)} | \frac{1}{2}\text{H}_{2(g)} | (\text{Pt})$
+2.37 V
(b) $\text{Mg}_{(s)} + 2\text{H}^{+}_{(aq)} \rightarrow \text{Mg}^{2+}_{(aq)} + \text{H}_{2(g)}$
(c) Mg metal
(d) More vigorous, since the potential difference between the Ca and the hydrogen half-cells is greater than the potential difference between the magnesium and hydrogen half-cells

3. Fluorine, it accepts electrons most readily, it is most easily reduced making it the best oxidizing agent

4.

(a)



The practical use of the hydrogen half-cell for determining E^\ominus values suffers from three main problems.

- It is difficult to set up the $\text{H}_{2(g)}$ at precisely 1 atm pressure
- It is fragile and non-portable
- The equilibrium $\text{H}^{+}_{(aq)} + \text{e}^{-} \rightleftharpoons \frac{1}{2}\text{H}_{2(g)}$ is only established slowly

(b) 298K, 1 atm, 1M

5.

- (a) It completes the circuit by allowing the flow of ions and balancing the charge
(b) A piece of filter paper soaked in an inert, ionic solution
(c) It draws no current and therefore the potential difference reading is not affected
(d) -1.18 V

6.

- (a) No. Reaction that is suggested has a negative E_{cell} . The reverse reaction has a positive E_{cell} and is the spontaneous one
(b) Yes. Reaction that is suggested has a positive E_{cell}