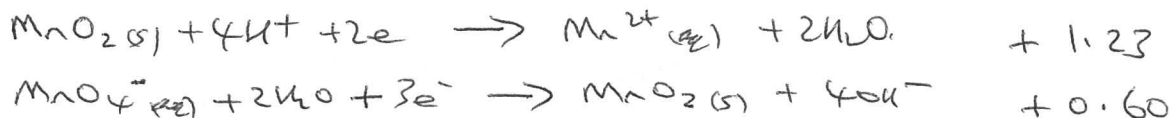
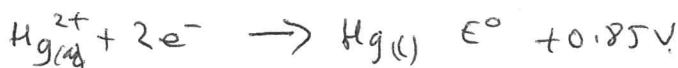
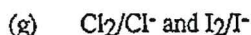
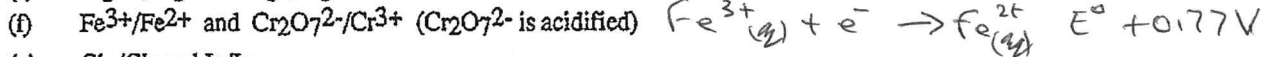
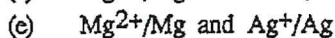
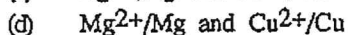
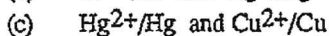
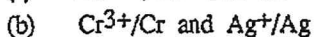
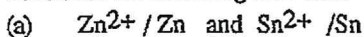


\*  
4 (e)

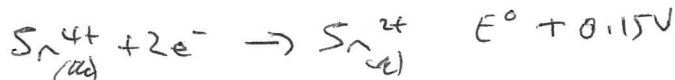
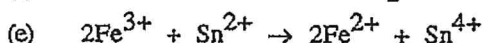
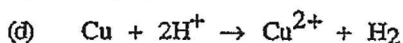
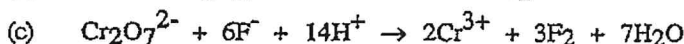
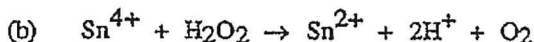
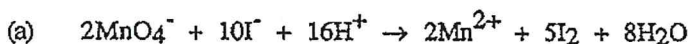


# Stawa Set 19

1. Calculate the standard cell voltages and write the overall chemical reactions for cells which consist of the following half-cells



2. Predict whether the following reactions could occur under standard conditions:



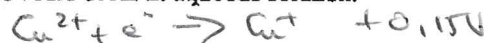
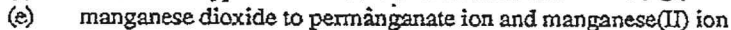
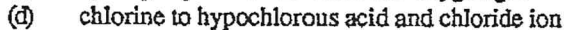
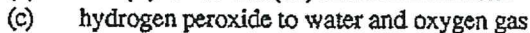
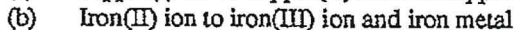
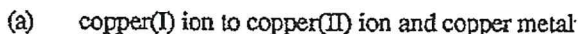
3. (a) Which of the following species could react with  $1 \text{ mol L}^{-1}$  HCl to form hydrogen gas?

- (i) Cu
- (ii) Mg
- (iii) Hg
- (iv) Ag
- (v) Sn
- (vi) Zn

(b) From the table of reduction potentials supplied, identify

- (i) a reducing agent which could convert  $\text{Pb}^{2+}$  to Pb, but not  $\text{Co}^{2+}$  to Co.
- (ii) an oxidising agent which could convert  $\text{Cl}^-$  to  $\text{Cl}_2$ , but not  $\text{F}^-$  to  $\text{F}_2$ .
- (iii) a reductant which could convert  $\text{H}^+$  to  $\text{H}_2$ , but not  $\text{H}_2\text{O}$  to  $\text{H}_2$ .
- (iv) an oxidant which could convert Ag to  $\text{Ag}^+$ , but not Hg to  $\text{Hg}^{2+}$ .
- (v) a reductant which could convert acidified  $\text{MnO}_4^-$  to  $\text{Mn}^{2+}$ , but not acidified  $\text{Cr}_2\text{O}_7^{2-}$  to  $\text{Cr}^{3+}$ .

4. Predict whether the following disproportionation reactions could occur in aqueous solution:



5. Predict whether reactions could occur in each of the following. Assume standard conditions.

(a) Chlorine gas is bubbled through potassium bromide solution.

(b) Iron(II) nitrate is mixed with sodium iodide.

(c) Aluminium is added to hydrochloric acid.

(d) An iron nail is placed in a tin(II) chloride solution.

(e) An iron(II) sulfate solution is placed in a nickel container.

(f) Hydrogen sulfide is bubbled through an acidified potassium dichromate solution.

(g) Chlorine gas is bubbled through an acidified solution of barium nitrate.

(h) Chlorine gas is bubbled through an acidified solution of iron(II) bromide.

# STAWA SET 19 : SOLUTIONS

## Set 19

1.
  - (a)  $\text{Zn} + \text{Sn}^{2+} \rightarrow \text{Zn}^{2+} + \text{Sn}$  , +0.62V
  - (b)  $3\text{Ag}^+ + \text{Cr} \rightarrow 3\text{Ag} + \text{Cr}^{3+}$  , +1.54V
  - (c)  $\text{Hg}^{2+} + \text{Cu} \rightarrow \text{Hg} + \text{Cu}^{2+}$  , +0.51V
  - (d)  $\text{Mg} + \text{Cu}^{2+} \rightarrow \text{Mg}^{2+} + \text{Cu}$  , +2.70V
  - (e)  $\text{Mg} + 2\text{Ag}^+ \rightarrow \text{Mg}^{2+} + 2\text{Ag}$  , +3.16V
  - (f)  $\text{Cr}_2\text{O}_7^{2-} + 14\text{H}^+ + 6\text{Fe}^{2+} \rightarrow 2\text{Cr}^{3+} + 7\text{H}_2\text{O} + 6\text{Fe}^{3+}$  , +0.56V
  - (g)  $\text{Cl}_2 + 2\text{I}^- \rightarrow 2\text{Cl}^- + \text{I}_2$  , +0.82V
  
2.
 

(a) Yes, +0.99V	(b) No, -0.53V
(c) No, -1.54V	(d) No, -0.34V
(e) Yes, +0.62V	
  
3.
  - (a) Mg, Sn, Zn
  - (b)
    - (i) Sn or Ni
    - (ii)  $\text{H}_2\text{O}_2$  or  $\text{MnO}_4^-$  (these are common oxidants, both must be acidified)
    - (iii) Pb, Sn, Ni, Co, Cd, Fe, Cr, Zn
    - (iv)  $\text{O}_2/4\text{H}^+$
    - (v) Au,  $\text{Cl}^-/\text{H}_2\text{O}$ ,  $\text{Cl}^-$
  
4.
 

(a) Yes, +0.37V	5. (a) $\text{Cl}_2 + 2\text{Br}^- \rightarrow 2\text{Cl}^- + \text{Br}_2$ , +0.27V
(b) No, -1.21V	(b) No reaction
(c) Yes, +1.10V	(c) $2\text{Al} + 6\text{H}^+ \rightarrow 2\text{Al}^{3+} + 3\text{H}_2$ , +1.66V
(d) No, -0.27V	(d) $\text{Fe} + \text{Sn}^{2+} \rightarrow \text{Fe}^{2+} + \text{Sn}$ , +0.30V
(e) Yes, +0.63V	(e) No reaction
	(f) $\text{Cr}_2\text{O}_7^{2-} + 3\text{H}_2\text{S} + 8\text{H}^+ \rightarrow 2\text{Cr}^{3+} + 3\text{S} + 7\text{H}_2\text{O}$ , +1.19V
	(g) No reaction
	(h) Both $\text{Br}^-$ and $\text{Fe}^{2+}$ are oxidised