

Spontaneous Rxn Worksheet

1. Spontaneous Rxn



← Cl_2 is strong enough OA to oxidize Br^-



← Br_2 is strong enough OA to oxidize I^-



← Cl_2 is strong enough OA to oxidize I^-

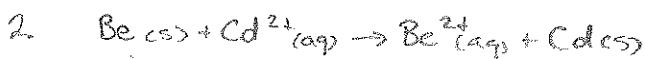
Nonspontaneous Rxn



Half Rxn



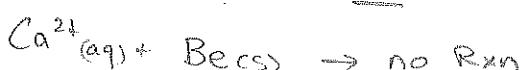
Redox table



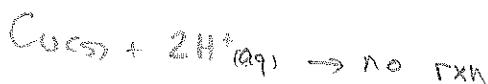
→ Cd^{2+} is a SOA than Be^{2+} bcz Cd^{2+} can oxidize Be(s)



→ H^+ is a SOA than Cd^{2+} bcz H^+ can oxidize Cd(s)



→ Ca^{2+} is a weaker OA than Be^{2+} bcz Ca^{2+} could not oxidize Be(s)

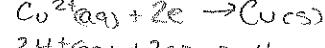


→ H^+ is a weaker OA than Cu^{2+} bcz H^+ can not oxidize Cu(s)

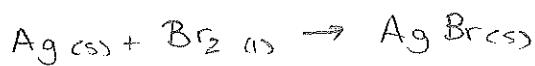
Half rxn



Redox table



3.



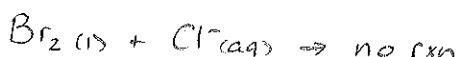
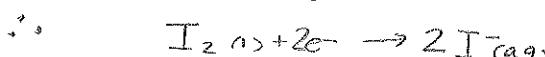
Ag is oxidized Br₂ is reduced



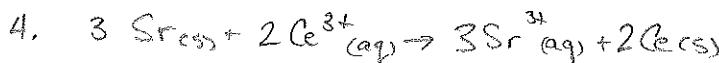
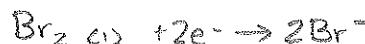
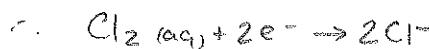
I₂ cannot oxidize Ag



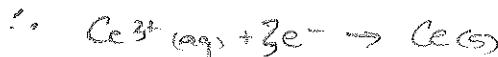
Cu²⁺ cannot oxidize I₂



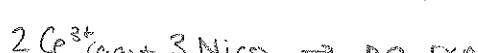
Br₂ cannot oxidize Cl⁻



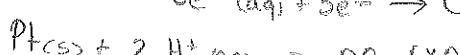
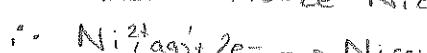
Ce²⁺ oxidizes Sr(s)



H⁺ can oxidize Ni(s)



Ce³⁺ cannot oxidize Ni(s)



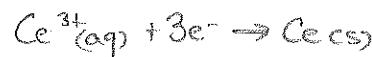
H⁺ cannot oxidize Pt(s)



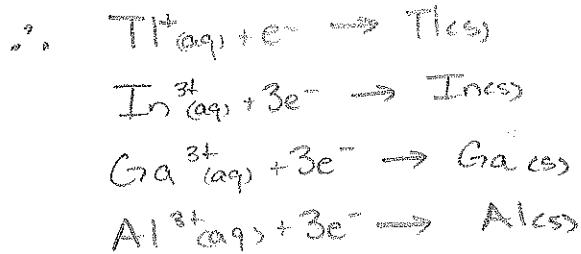
Redox table



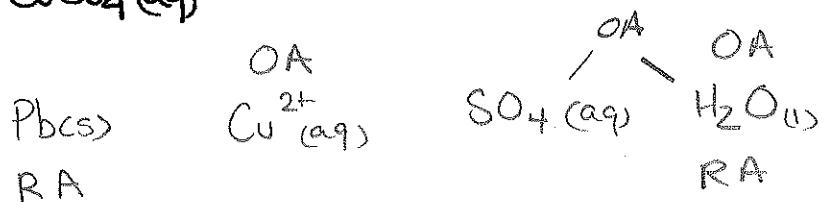
Redox table



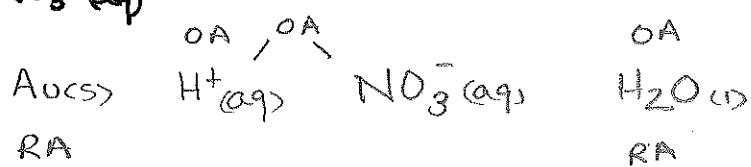
5. Al can be oxidized by Ti^+ , Ga^{3+} , In^{3+}
 Ti cannot be oxidized by anything $\rightarrow \therefore \text{SOA}$
 Ga can be oxidized by Ti^+ , In^{3+}
 In can be oxidized by Ti^+



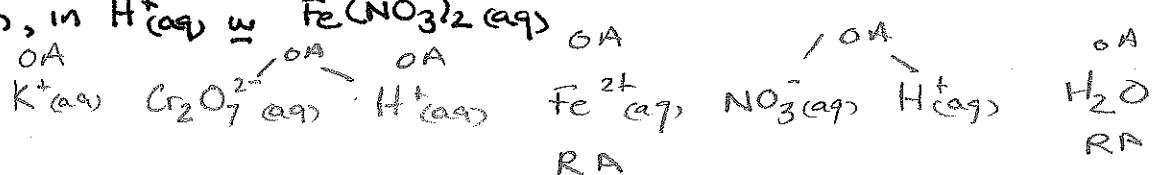
7a) $\text{Pb}^{(\text{s})}$ in $\text{CuSO}_4_{(\text{aq})}$



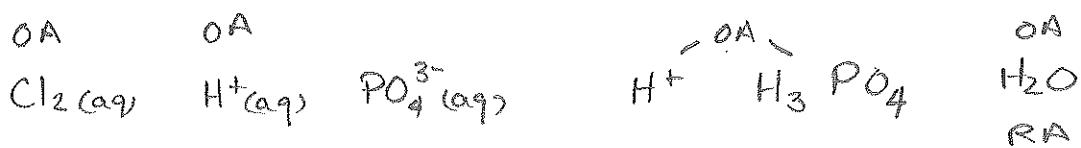
b) $\text{Au}^{(\text{s})}$ in $\text{HNO}_3_{(\text{aq})}$



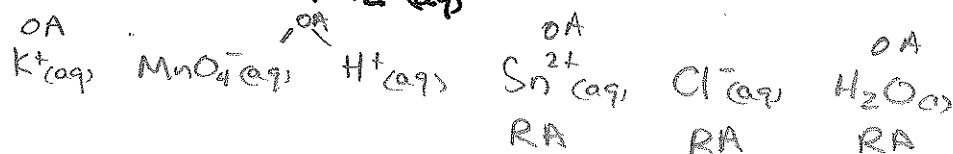
c) $\text{K}_2\text{Cr}_2\text{O}_7_{(\text{aq})}$, in $\text{H}^+_{(\text{aq})}$ w/ $\text{Fe}(\text{NO}_3)_2_{(\text{aq})}$



d) $\text{Cl}_2_{(\text{aq})}$, in $\text{H}_3\text{PO}_4_{(\text{aq})}$

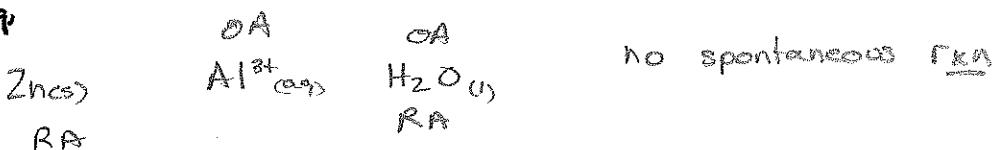
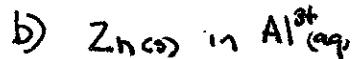
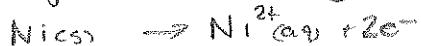
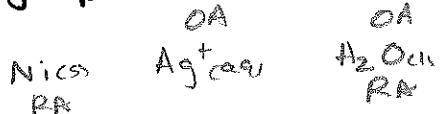


e) $\text{KMnO}_4_{(\text{aq})}$ in acidified $\text{SnCl}_2_{(\text{aq})}$

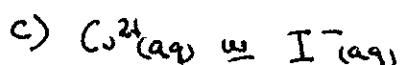


f) $\text{I}_2_{(\text{aq})}$, $\text{OH}^-_{(\text{aq})}$, $\text{MnO}_2_{(\text{s})}$

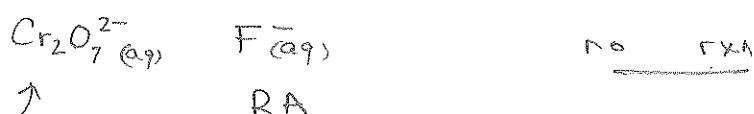
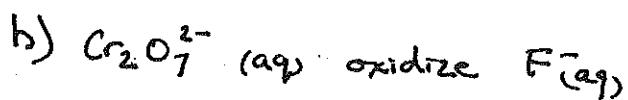
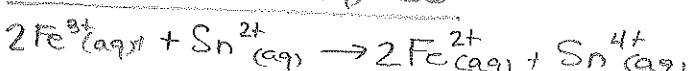
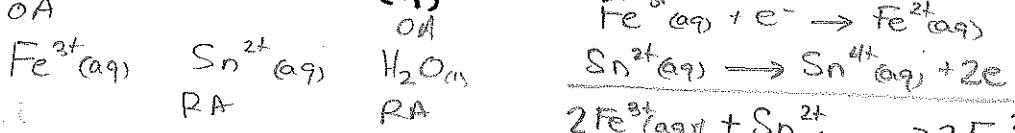
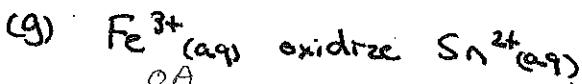
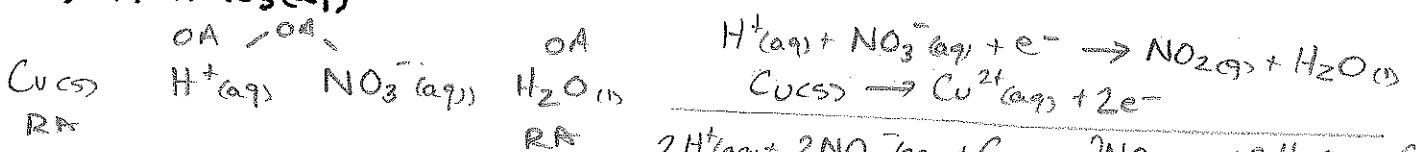
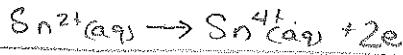
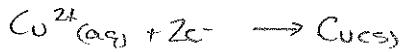
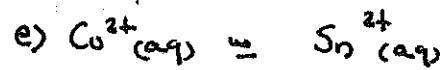
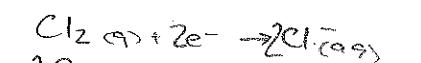
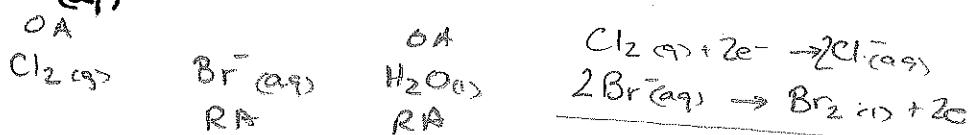
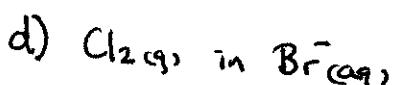




no spontaneous rxn

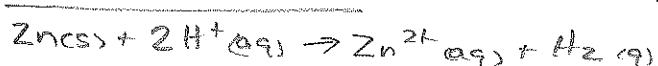
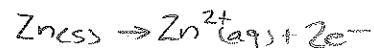
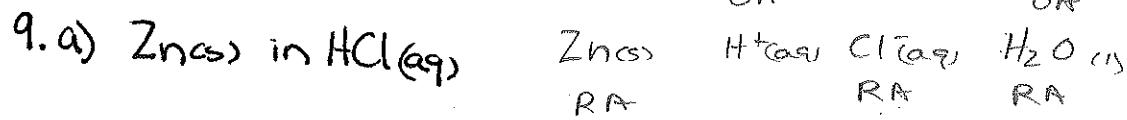
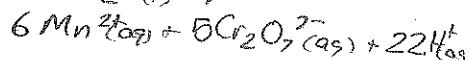
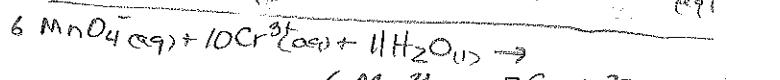
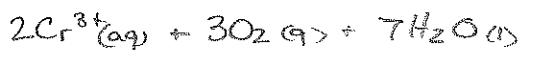
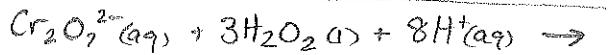
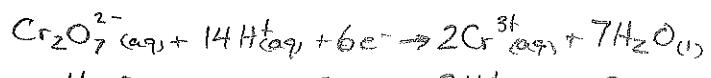
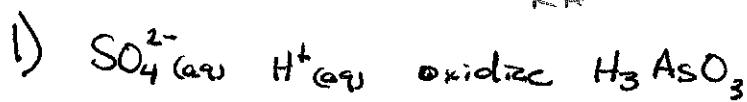
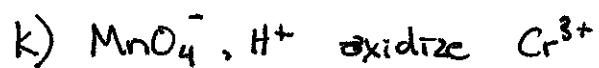
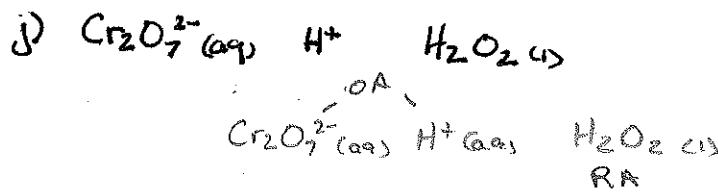
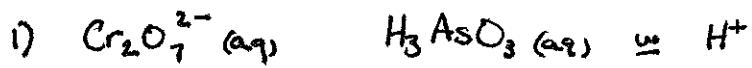


no spontaneous rxn



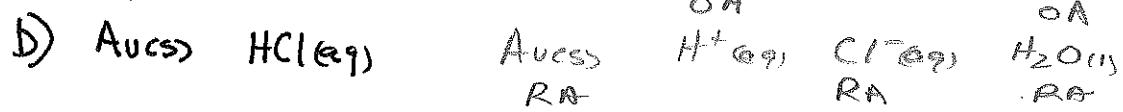
no rxn

not acidified
not rxn

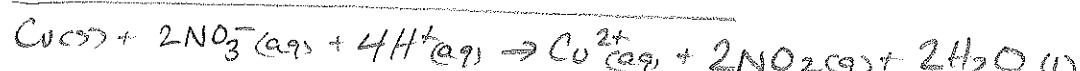
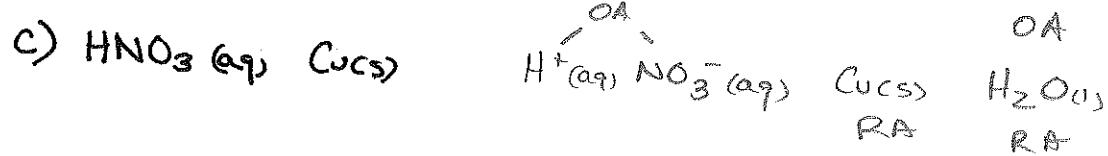


↙ test for $\text{H}_2(\text{g})$

burning splint test



no net $\underline{\text{rxn}}$



10 a)

Activity Series

Li most reactive

K
Ba
Ca
Na
Mg

→ according to Activity Series a more reactive metal can displace a less reactive metal in a single displacement rxn

Al

Zn

Fe

Ni

Sn

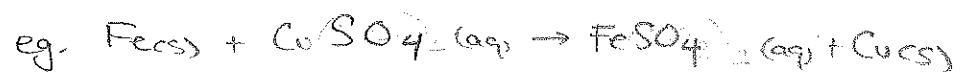
Pb

H

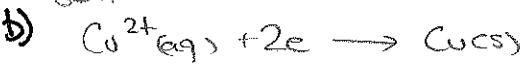
Cu

Ag

Au least reactive



SOA



→ according to redox theory if the OA is above the RA a spontaneous Rxn will occur.



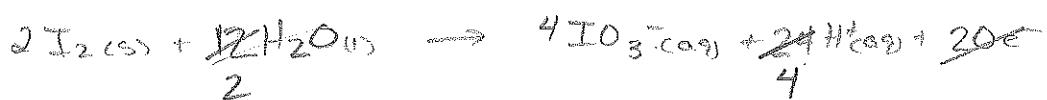
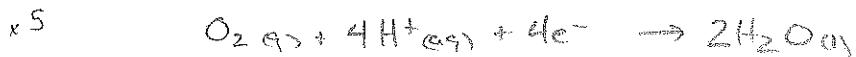
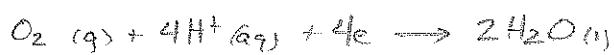
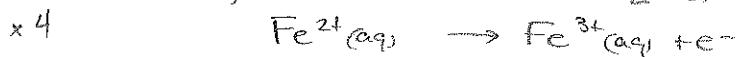
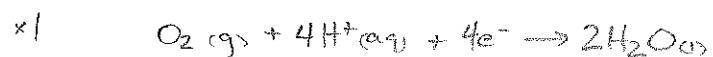
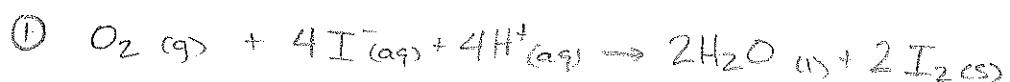
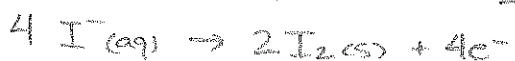
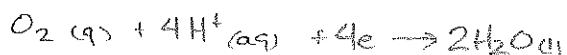
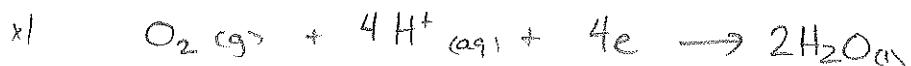
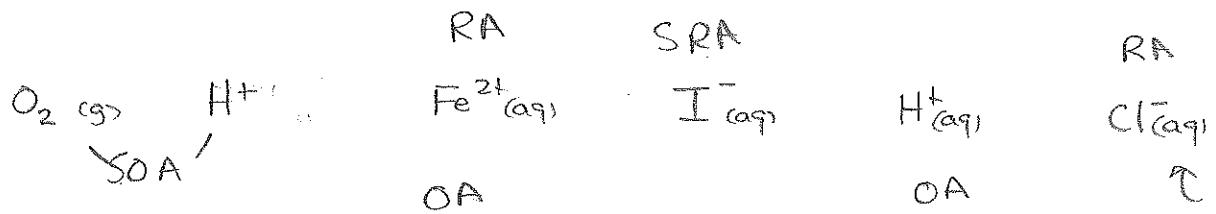
c) Both are correct

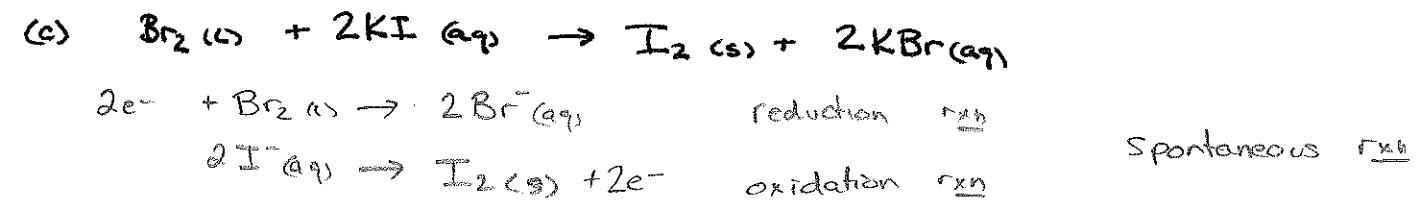
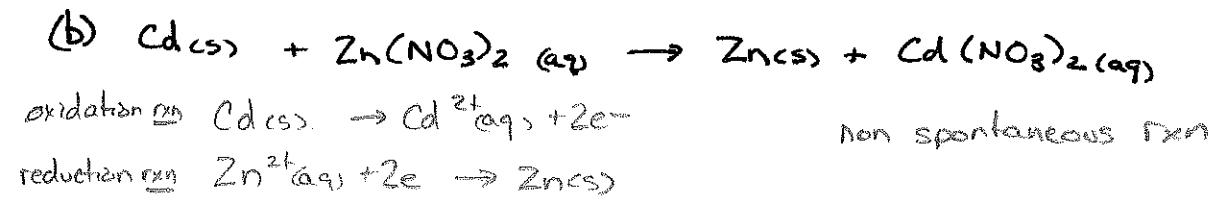
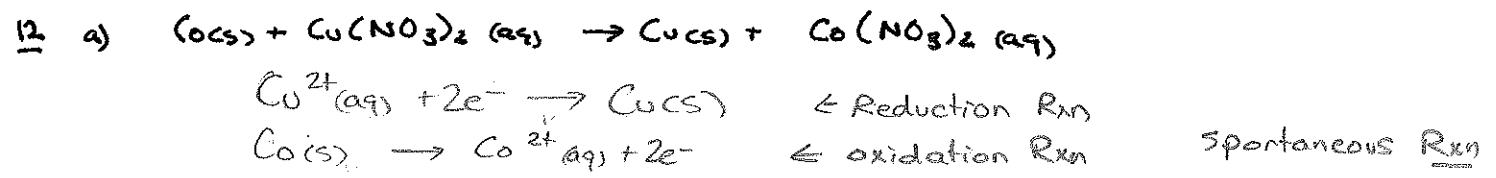
→ how you interpret it

→ Activity Series lists RA from SRA to WRA

→ if a RA is lower, its ion, which will act as an OA, will be able to remove O^- from the metal

II.





13.

