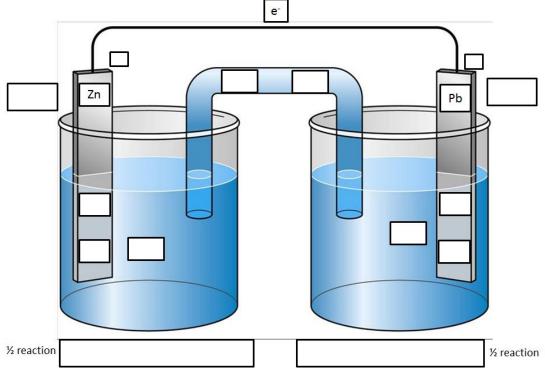
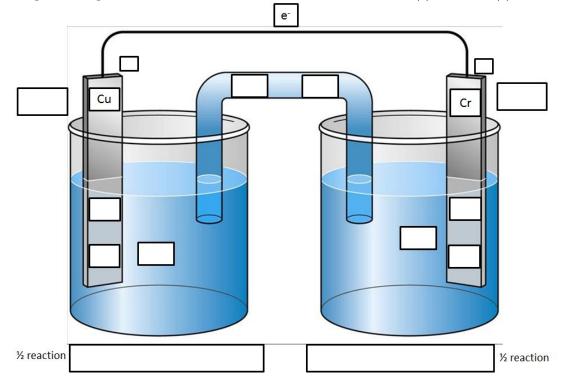
Score: ____/25

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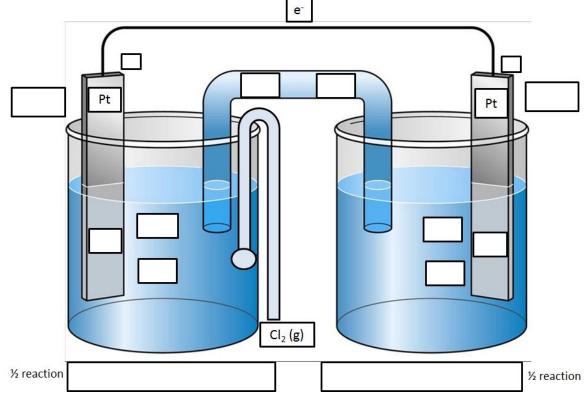
[6 pt] 1. Using the cell drawn below. Label the following: electrodes (+/-), species in solution, anode, cathode, direction of the electron flow in the wire and the flow of all ions in solution. Assume that NaNO₃ is used in the salt bridge. Write the balance 1/2-reactions under each electrode. The galvanic cell reaction is $Zn(s) + Pb^{+2} \longrightarrow Zn^{+2} + Pb(s)$



[6 pt] 2. Repeat the previous question for a cell whose reaction is: $3Cu^{+2} + 2Cr(s) \longrightarrow 3Cu(s) + 2Cr^{+3}$



[6 pt] 3. Repeat the previous question for a cell whose reaction is: $Cl_2(g) + Sn^{+2} \longrightarrow Sn^{+4} + 2Cl^-$.



[7 pt] 4. For each of the following reactions write the standard shorthand notation for each cell. (a) $3Cu^{+2} + 2Cr(s) \longrightarrow 3Cu(s) + 2Cr^{+3}$

(b)
$$Pb(s) + 2H^+ \longrightarrow Pb^{+2} + H_2(g)$$

(c)
$$\operatorname{Cl}_2(g) + \operatorname{Sn}^{+2}(aq) \longrightarrow \operatorname{Sn}^{+4}(aq) + 2\operatorname{Cl}^-(aq)$$