Electrochemistry KEY

1. Au with Cl^-, NO, Hg, H_2O, N_2O_4, Ag, Fe^{2+}, H_2O_2, MnO_2 (basic)
2. E^o= -1.21 V,
   non-spontaneous rxn,
   reducing agent: Cl^-
   oxidizing agent: Sn^{4+}
3. It maintains electrical neutrality in each half cell. It provides a path for the ions
4. – 0.40 V
5. mass of anode decreases, [Ag+] decreases, 0.94 V
6. $3 \text{ X } (Ag \rightarrow Ag^+ + 3e^-)$
   $3e- + 4H^+ + NO_3^- \rightarrow NO + 2H_2O)$
   overall: $3 Ag + NO_3^- + 4H^+ \rightarrow NO + 2H_2O + 3Ag^+$
7. Ru>Ag>Pd
8. Ag^+ is a stronger oxidizing agent than Ti^{2+}
9. $MnO_4^- + 8H^+ + 5e^- \rightarrow Mn^{2+} + 4H_2O$
   $5 \text{ X } (Fe^{2+} \rightarrow Fe^{3+} + e\text{-})$
   Overall: $MnO_4^- + 8H^+ + 5Fe^{2+} \rightarrow Mn^{2+} + 4H_2O + 5Fe^{3+}$
10. +5
11. -1.10 V
12. $2MnO_4^- + 16H^+ + 5Sn^{2+} \rightarrow 2Mn^{2+}\ 8H_2O + 5Sn^{4+}$
    0.134 M
13. $O_2 + 2H_2O + 4e\text{-} \rightarrow 4OH^-$
14. it oxidizes more readily than the protected metal
15.
16. mole $KMnO_4$ = 0.01450 L X 0.0200mol/L = 2.90X10-4 mol
    mole CH_3OH = mole KMnO4 * 5/2 = 7.25 X 10-4 mol
    [CH_3OH] = 7.25 X 10-4 mol/0.0250 L = 0.0290M
17. [Cu^{2+}] decreases. [Zn^{2+}] increases. Mass of Zn decreases redox occurs, etc..
18. I^- reacts with acidified IO_3^- but not with acidified SO_4^{-2}
    $2 \text{ X } (IO_3^- + 6H^+ + 5e \rightarrow \frac{1}{2} I_2 + 3H_2O)$
    $5 \text{ X } (2I\text{-} \rightarrow I2 + 2e\text{-})$
    $2IO_3^- + 12H^+ + 10 I^- \rightarrow 6 I_2 + 6 H_2O$
    REDUCE!!
    $IO_3^- + 6 H^+ + 5 I^- \rightarrow 3 I_2 + 3 H_2O$