Answers to non communist

1. D
2. C
3. A
4. B
5. C
6. A
7. E
8. A

9.

moles	**A** **+**	**B** **=**	**C**
I	0.0100	0.0200	0
C (R/F)	x	x	x
E	0.0100-x	0.0200-x	0+x = x

K = [C]/([A][B])
0.371 = [x/2]/([(0.0100-x)/2] [(0.0200-x)/2])

This leads to a quadratic equation:
$0.00007420000000 - 0.011130000x + 0.3710000000x^2 = 0$

x = 0.00003689493221 or 5.420798685

so [C] = 0.0000369/2 = 0.000018 M
[B] = 0.010 M
[C] = 0.0050 M

10. Let x = number of grams of SrF_2 that dissolve:

Moles/L	$SrF_{2(s)}$ =	$Sr^{+2}{}_{(aq)}$	+ 2 $F^{-1}{}_{(aq)}$
I	y	0	0
C (R/F)	x dissolve	x	2x
E	y-x	0 + x = x	0 + 2x = 2x

But we can’t really have moles/L of a solid, so the K expression excludes solids:

$K = [Sr^{+2}{}_{(aq)}][F^{-1}{}_{(aq)}]^2 = [x][2x]^2 = 7.8 \times 10^{-10}$
$4x^3 = 7.8 \times 10^{-10}$
x = 0.0005798889998 moles/L
0.0005798889998 moles/L * 1.0L *(87.6 + 19*2) = 0.073 g will dissolve

11.

Beaker	Reaction?	Inference
1	No	$Q^{+3} > V^{+3}$
2	Yes	$V^{+3} > M^{+?}$
3	Yes	$X^{+2} > V^{+3}$
4	no	$X^{+2} > Q^{+3}$

We see the strongest oxidizing agent at work in reaction 3 where it is stealing electrons from metal V:

$$3\ X^{+2} + 2\ V \rightarrow 2\ V^{+3} + 3\ X$$

12. Hydrogen's reduction/oxidation potential is 0.00V under standard conditions:

$Br_2 = 2\ Br^- + 2e-$ 1.09 V
$H_2 + 2e^- = 2\ H^+$ 0.00 V

$Br_2 + H_2 = 2\ Br^- + 2\ H^+$ 1.09 V

Notice that you have to choose something with a positive reduction potential to end up with the same *positive* value overall.

13. Since the standard reduction potentials are 1.0 M, the most likely source of error is choosing a concentration that is less than 1.0 M for the *oxidizing agen*t at the cathode or choosing a concentration greater than 1.0 M for the reducing agent's companion cation. In both of these cases, by LeChatelier's principle, a lower voltage will result.

Example: $Zn + Cu^{+2} = Zn^{+2} + Cu$