Page 1

a) $C_A V_A = C_B V_B \Rightarrow C_A = \frac{C_B V_B}{V_A} = \frac{(0.311)(27.7)}{(25.0)} = 0.3446\ M$

$$\left.\begin{array}{l} 0.3446\ mol \rightarrow 1000\ mL \\ x \rightarrow 25.0\ mL \end{array}\right\} x = 0.008615\ mol$$

$MM = 4.33\ g / 0.008615\ mol = \underline{503\ g/mol}$

$x = [A^-] = [H^+] = 10^{-pH} = 10^{-1.11} = 0.0776\ M$

$K_a = \frac{[H^+][A^-]}{[HA]} = \frac{[H^+][A^-]}{([HA]_o - x)} = \frac{(0.0776)^2}{(0.3446 - 0.0776)} = 2.3 \times 10^{-2}$

$K_b = 1.0 \times 10^{-14} / K_a = 1.0 \times 10^{-14} / (2.3 \times 10^{-2}) = \underline{4.4 \times 10^{-13}}$

b) $SnF_4(s) \rightleftharpoons Sn^{4+}(aq) + 4\,F^-(aq)$

i:	—	—
c:	$+x$	$+4x$
e:	x	$4x$

$K_{ps} = [Sn^{4+}][F^-]^4 \Rightarrow 6.0 \times 10^{-25} = (x)(4x)^4 = 256x^5$

$x = \sqrt[5]{6.0 \times 10^{-25} / 256} = 4.72 \times 10^{-6}\ mol/L$

$solubilité = (4.72 \times 10^{-6}\ mol/L)(194.70\ g/mol) = \underline{9.2 \times 10^{-4}\ g/L}$

Page 2

a) $k_{25} = \ln 2 / t_{1/2} = \ln 2 / 88.0 = 0.007877$

$k_{50} = \ln 2 / t_{1/2} = \ln 2 / 55.0 = 0.012603$

$$\ln(k_{50}/k_{25}) = \frac{-E_a}{R}\left(\frac{1}{323.15} - \frac{1}{298.15}\right) \Rightarrow E_a = \frac{-8.3145 \ln\left(\frac{0.012603}{0.007877}\right)}{\left(1/323.15 - 1/298.15\right)}$$

$E_a = 15060\ J$

$$\ln(k_{75}/k_{25}) = \frac{-E_a}{R}\left(\frac{1}{348.15} - \frac{1}{298.15}\right) = \frac{-15060}{8.3145}\left(\frac{1}{348.15} - \frac{1}{298.15}\right)$$

$\ln(k_{75}/k_{25}) = 0.87248 \Rightarrow k_{75}/k_{25} = 2.3928$

$k_{75} = k_{25}(2.3928) = (0.007877)(2.3928) = \underline{0.0188\ s^{-1}}$

b) $Ag^+(aq) + 2\,CN^-(aq) \rightleftharpoons Ag(CN)_2^-(aq)$

i:	0.0555	0.666	–
c:	−0.0555	−2 × 0.0555	+0.0555
e:	–	0.555 M	0.0555 M

$1.0 \times 10^{21} = \dfrac{[Ag(CN)_2^-]}{[Ag^+][CN^-]^2} \Rightarrow [Ag^+] = \dfrac{[Ag(CN)_2^-]}{(1.0 \times 10^{21})[CN^-]^2}$

$[Ag^+] = (0.0555)/(1.0 \times 10^{21})(0.555)^2 = \underline{1.8 \times 10^{-22}\ M}$

a) $pH(\text{avant}) = pK_a + \log\left(\frac{[A^-]}{[HA]}\right)$

$= -\log(5.0\times10^{-3}) + \log\left(\frac{0.233}{0.177}\right) = \underline{2.42}$

$n_{HA} = C \times V = (0.177)(3.000) = 0.531\ mol$

$n_{A^-} = C \times V = (0.233)(3.000) = 0.699\ mol$

$OH^-(aq) + HA(aq) \rightleftharpoons H_2O(l) + A^-(aq)$

i:	0.100	0.531	0.699
c:	-0.100	-0.100	+0.100
e:	-	0.431	0.799

$pH(\text{après}) = -\log(5.0\times10^{-3}) + \log\left(\frac{0.799}{0.431}\right) = \underline{2.57}$

b) laissez $t = 100\ s$ et $t = 200\ s$ devenir $t = 0\ s$ et $t = 100\ s$ afin de calculer la valeur de k

$\ln([A]_0/[A]) = kt \Longrightarrow k = \ln([A]_0/[A])/t$

$k = \ln(0.477/0.377)/100.0 = 0.002353$

$\Rightarrow$ trouvez t où $[A] = 0.277\ M$

$t = \ln([A]_0/[A])/k = \ln(0.477/0.277)/0.002353 = 231\ s$

$\Rightarrow$ on doit réajuster t au vrai zéro pour le temps en ajoutant 100 s

$t = 231 + 100 = \underline{331\ s}$

A) par inspection, c'est evident que A n'a aucune influence sur la vitesse tandis que l'effet de B, ainsi que C, est linéaire (ordre un), donc

$$v = k[B][C]$$

⇒ utilisant n'importe quel essaie, on trouve la valeur de k

$$k = \frac{v}{[B][C]} = \frac{(0.25\ M s^{-1})}{(0.25M)(0.25M)} = 4.0\ M^{-1}s^{-1}$$

$$\Rightarrow \underline{\underline{v = (4.0)[B][C]}}$$

⇒ quand $[B] = 0.75\ M$ et $[C] = 0.75\ M$:

$$v = (4.0)(0.75)(0.75) = \underline{\underline{2.25\ M s^{-1}}}$$

B) a) 1

b) 15

c) 11

d) 12

e) 6

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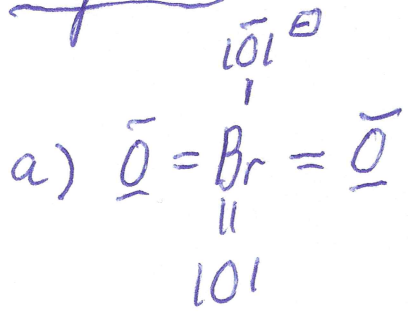
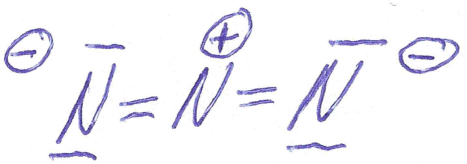
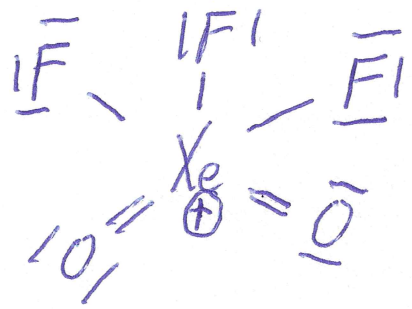
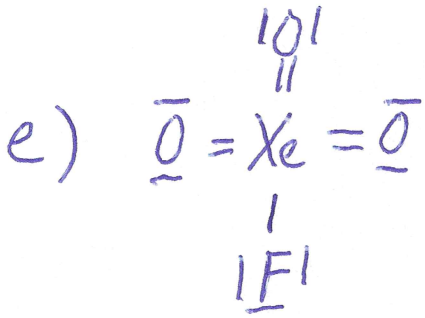
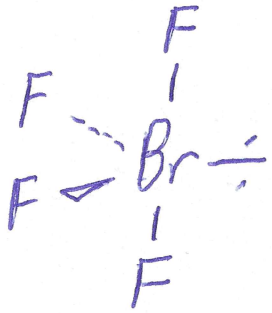
a) 

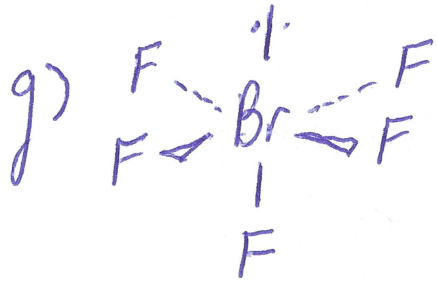
b) 

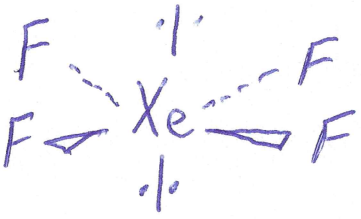
c) 

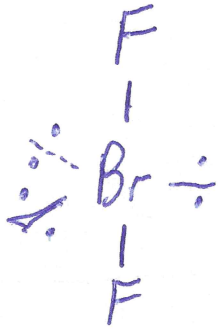
d) 

e) 

f) 

g) 

h) 

i) 

j)