Gabarito de Produto de Solubilidade

① a) $MX_2 \rightleftharpoons M^{2+} + 2X^-$

0,002 0,002 0,004

$K_S = [M^{2+}][2x]^2 = 0,002 \cdot 0,004^2 = 3,2 \times 10^{-8}$

b) $M_2X_3 \rightleftharpoons 2M^{3+} + 3X^{2-}$

$\frac{0,045\ mg}{100\ mL} = \frac{0,045 \cdot 10^{-3}\ g}{0,1\ L} = 4,5 \times 10^{-4}\ g\ L^{-1}$

$M = \frac{C}{MM} = \frac{4,5 \times 10^{-4}}{150} = 3,0 \times 10^{-6}\ mol\ L^{-1}$

$M_2X_3 \rightleftharpoons 2M^{3+} + 3X^{2-}$

$3,0 \times 10^{-6}$ $6,0 \times 10^{-6}$ $9,0 \times 10^{-6}$

$K_S = [M^{3+}]^2 [X^{2-}]^3$

$K_S = (6,0 \times 10^{-6})^2 (9,0 \times 10^{-6})^3 = 2,62 \times 10^{-26}$

c) $M_2X \rightleftharpoons 2M^+ + X^{2-}$

$2,0 \times 10^{-10}$ $4,0 \times 10^{-10}$ $2,0 \times 10^{-10}$

$K_S = [M^+]^2 [X^{2-}]$

$K_S = (4,0 \times 10^{-10})^2 \cdot 2,0 \times 10^{-10} = 3,2 \times 10^{-29}$

d) $MX_3 \rightleftharpoons M^{3+} + 3X^-$

$2,0 \times 10^{-10}$ 0,1

$K_S = [M^{3+}][X^-]^3$

$K_S = 2,0 \times 10^{-10} \cdot 0,1^3 = 2,0 \times 10^{-13}$

② $PbSO_4 \rightleftharpoons Pb^{2+} + SO_4^{2-}$

x x x

$K_S = [Pb^{2+}][SO_4^{2-}]$

$1,6 \times 10^{-8} = x \cdot x = x^2 \Rightarrow x = \sqrt{1,6 \times 10^{-8}} = 1,26 \times 10^{-4}$

$PbI_2 \rightleftharpoons Pb^{2+} + 2I^-$

x x 2x

$K_S = x \cdot (2x)^2 = x \cdot 4x^2 = 4x^3$

$7,1 \times 10^{-9} = 4x^3$

$x = \sqrt[3]{\frac{7,1 \times 10^{-9}}{4}} = 1,21 \times 10^{-3}$

Devido à proporção estequiométrica de 2:1.