

(25)



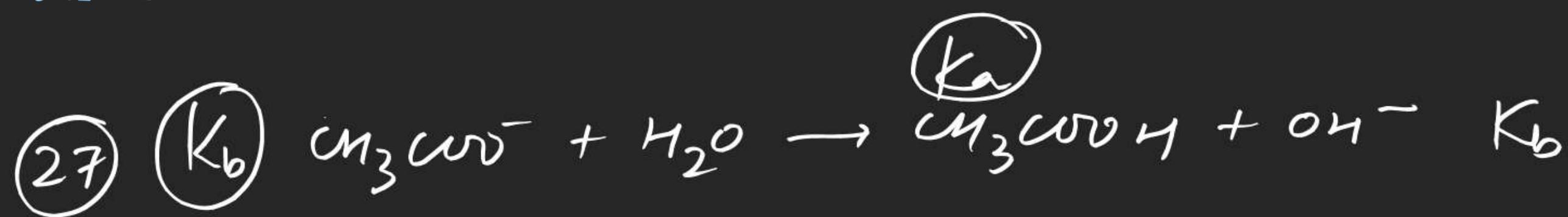
$$K_a \times K_b = K_w$$

$$pK_a + pK_b = 14$$

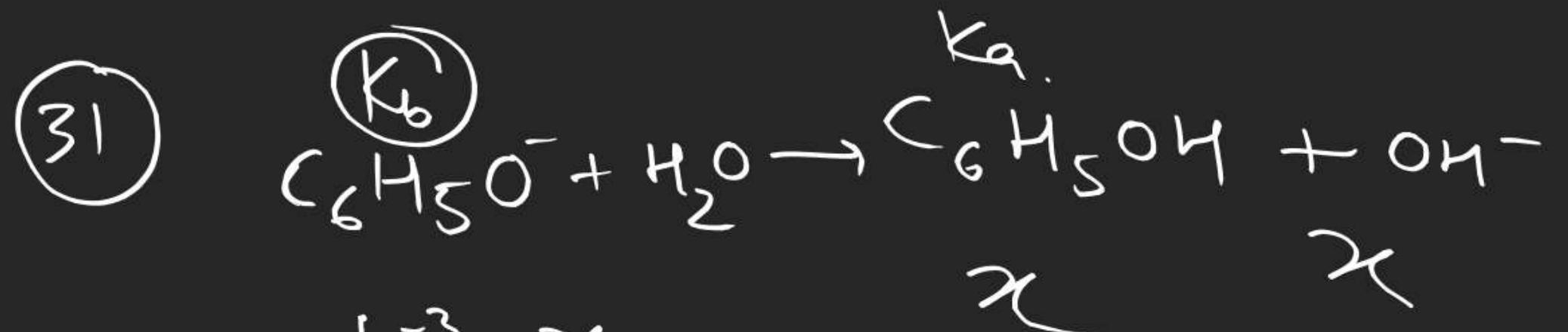
S-I

25, 27, 28, 31

S 9 - 63



$$\frac{K_w}{K_a} = K_b = \frac{x^2}{0.08 - x}$$



$$\frac{10^{-3}}{1.05 \times 10^{-10}} = \frac{K_w}{K_a} = K_b = \frac{x^2}{10^{-3} - x}$$

$$\textcircled{60} \quad S = \frac{38 \times 10^{-3}}{304} \text{ mol/lit}$$

$$= \frac{380}{304} \times 10^{-4}$$

$$S = 1.25 \times 10^{-4}$$

$$K_{sp} = (1.25 \times 10^{-4})^2$$

$$= 1.56 \times 10^{-8}$$

$$\textcircled{62} \quad \frac{2.4 \times 10^{-5} \times 10}{60}$$

$$S = 4 \times 10^{-6}$$

\textcircled{61}



$$\frac{S}{2S} = \frac{4.1 \times 10^{-4}}{2S}$$



Volume ↑

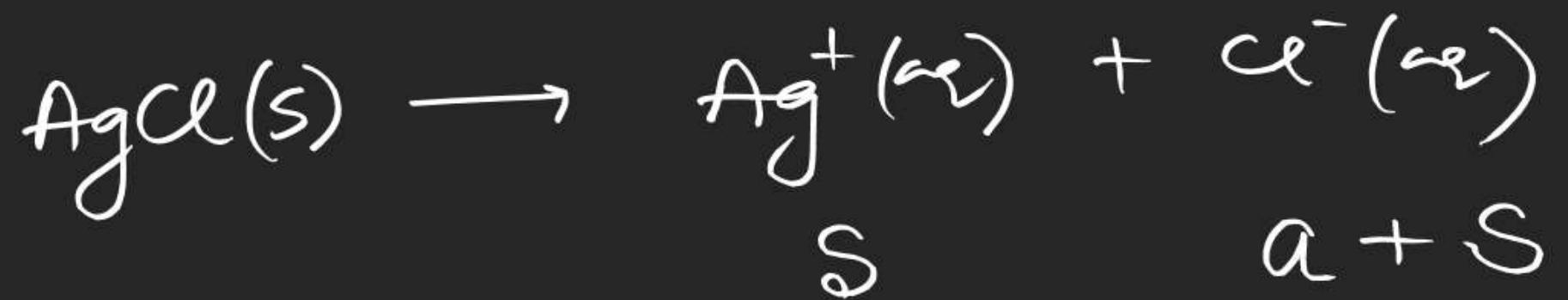
Conc.



Addⁿ of molles ↓

$\text{H}_2\text{O(l)}$ conc ↓

Solubility in presence of common ion



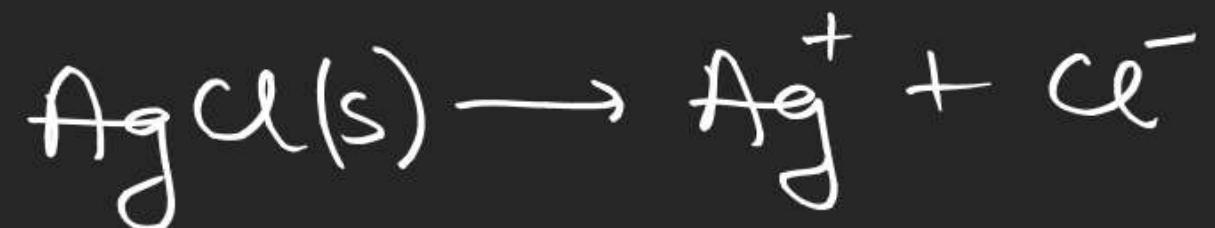
$$K_{sp} = \frac{s}{s(a+s)}$$

AgCl in

Q. find solubility of AgCl in

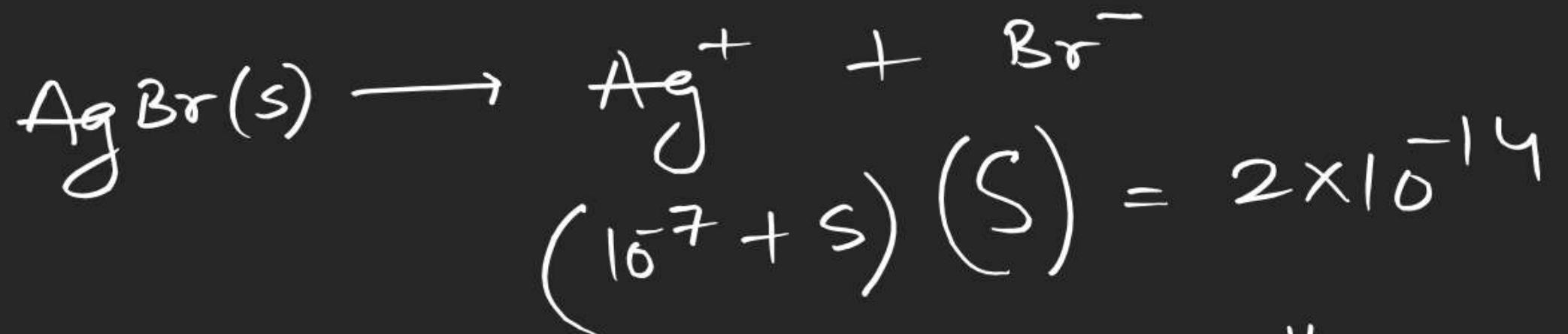
$$10^{-10} = s(10^{-2} + s)$$

$$10^{-8} = s$$



Find Solubility of AgBr in 10^{-7}M AgNO_3 soln

$$K_{\text{sp}}(\text{Ag Br}) = 2 \times 10^{-14}$$



$$s^2 + 10^{-7}s - 2 \times 10^{-14} = 0$$

$$\underline{s = 10^{-7}}$$

Simultaneous solubility →

find Ag^+ conc if $\text{AgBr}(s)$ & $\text{AgCl}(s)$ both are dissolved simultaneously in $\text{H}_2\text{O}(l)$.

Given $K_{sp}(\text{AgCl}) = 110 \times 10^{-12}$

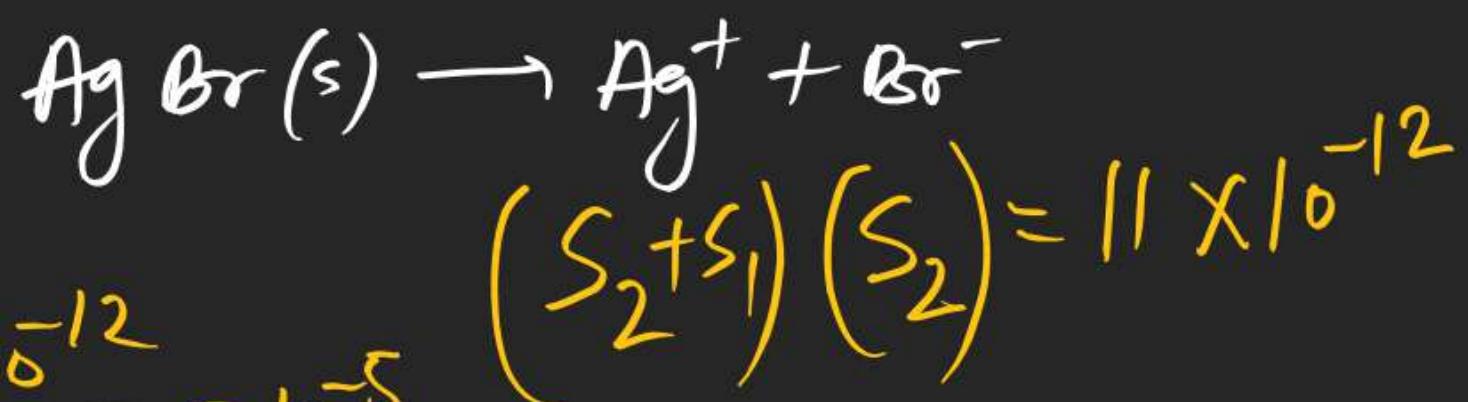
$$K_{sp}(\text{AgBr}) = 11 \times 10^{-12}$$

$$(S_1 + S_2)^2 = 121 \times 10^{-12}$$

$$S_1 + S_2 = 11 \times 10^{-6}$$

$$S_1 = \frac{110 \times 10^{-12}}{11 \times 10^{-6}} = 10^{-5}$$

$$S_2 = 10^{-6}$$



Appl'n of K_{sp} i.e. cond'n of precipitation

$$[\text{Ag}^+] [\text{Cl}^-] = Q > K_{\text{sp}}$$

$$[\text{Ag}^+] [\text{Cl}^-] = Q = \underline{K_{\text{sp}}}$$

Pptⁿ occurs
at eqlb^m
(or saturated)

Q: find minimum Cl^-
required to ppt AgCl
from 0.01 M AgNO_3 soln

$$K_{\text{sp}}(\text{AgCl}) = 10^{-10}$$

$Q < K_{\text{sp}}$ more Cl^-
can be added

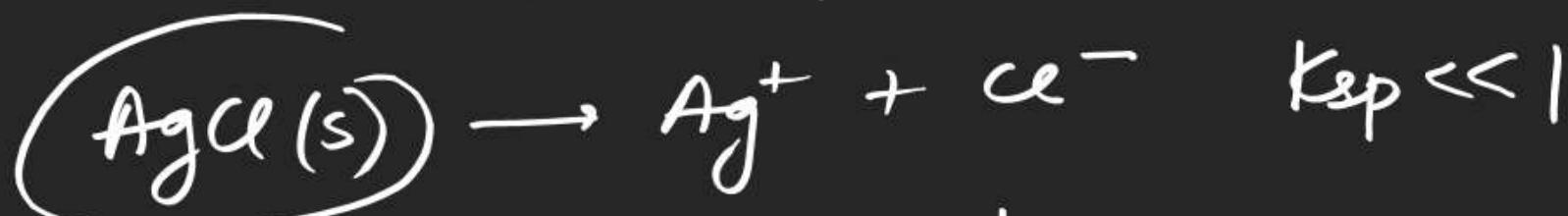
$$\begin{cases} Q > K_{\text{sp}} \\ Q = K_{\text{sp}} \end{cases}$$

$$[\text{Cl}^-] (10^{-2}) = 10^{-10}$$

$$[\text{Cl}^-] = 10^{-8}$$

$$[\text{Ag}^+] = \frac{K_{\text{sp}}}{[\text{Cl}^-]}$$

Calculation of conc. of ions after pptn



a	b
0	$b - a$
s	$b - a + \beta$

$$K_{\text{sp}} = s(b - a + \beta)$$



$$0.1 - s \quad (0.01 + \beta) = 10^{-10}$$

$$\underline{\underline{s = 10^{-8}}}$$

find final conc of each ion if 0.11 mol Cl^- are added to 1 lit 0.1M Ag^+ (or) Given $K_{\text{sp}}(\text{AgCl}) = 10^{-10}$

$$[\text{Ag}^+] = 10^{-8}$$

$$[\text{Cl}^-] = 10^{-2}$$

find Ag^+ conc if 3 moles g Cl^- are added to

10 lit 0.2 M AgNO_3 soln.

$$\text{K}_{\text{sp}}(\text{AgCl}) = 10^{-10}$$



$$2 \text{ mol} \quad 3 \text{ mol}$$

$$\begin{array}{cc} \cancel{2 \text{ mol}} & 0 \\ & 1 \\ 0 & 0.1 \end{array}$$

$$(S)(0.1 + \cancel{\delta}) = 10^{-10}$$

$$S = 10^{-9}$$



$$0.2 \quad \frac{3}{10}$$

$$0.2 \quad 0.3$$

$$0 \quad 0.1$$

$$S \quad 0.1 + \cancel{\delta}$$

$$(S)(0.1) = 10^{-10}$$

O-L 89 - 94
S-I 68 - 71

Ionic

	Lecture	O-I	S-II	J-Mains	J-Adv	O-II	S-II
Atomic str	✓	✓	✗		✓		
Chemical eq	✓	✗	✗		✓		