PHYSICAL / INORGANIC CHEMISTRY

DPP
DAILY PRACTICE PROBLEMS

DPP No. 20

Total Marks : 44

Max. Time : 52 min.

Topic : Ionic Equilibrium

Type of Questions		M.M., Min.
Single choice Objective ('–1' negative marking) Q.1 to Q.4	(3 marks, 3 min.)	[12, 12]
Subjective Questions ('–1' negative marking) Q.5 to Q.12	(4 marks, 5 min.)	[32, 40]

1. **(a)** The solubility of A_2X is y mol dm^{-3}. Its solubility product is :

(A) $6\ y^4$ (B) $64\ y^4$ (C) $36\ y^5$ (D) $4\ y^3$

(b) The solubility of sparingly soluble electrolyte M_mA_a in water is given by the expression :

(A) $s = \left(\frac{K_{sp}}{m^m a^a}\right)^{m+a}$ (B) $s = \left(\frac{K_{sp}}{m^m a^a}\right)^{1/m+a}$ (C) $s = \left(\frac{K_{sp}}{m^a a^m}\right)^{m+a}$ (D) $s = \left(\frac{K_{sp}}{m^a a^m}\right)^{1/m+a}$

2. Three sparingly soluble salts M_2X, MX and MX_3 have the solubility product are in the ratio of 4: 1 : 27. Their solubilities will be in the order

(A) $MX_3 > MX > M_2X$ (B) $MX_3 > M_2X > MX$ (C) $MX > MX_3 > M_2X$ (D) $MX > M_2X > MX_3$

3. A student wants to prepare a saturated solution of Ag^+ ion . He has got three samples AgCl ($K_{sp} = 10^{-10}$) , AgBr ($K_{sp} = 1.6 \times 10^{-13}$) and Ag_2CrO_4 ($K_{sp} = 3.2 \times 10^{-11}$) . Which of the above compound will be used by him using minimum weight to prepare 1 lit. of saturated solution .

(A) AgCl (B) AgBr (C) Ag_2CrO_4 (D) all the above

4. The solubility product of AgCl is 4.0×10^{-10} at 298K. The solubility of AgCl in 0.04M $CaCl_2$ will be:

(A) 2.0×10^{-5} M (B) 1.0×10^{-10} M (C) 5.0×10^{-9} M (D) 2.2×10^{-4} M

5. Calculate the solubility of A_2X_3 in pure water, assuming neither kind of ion reacts with water. For A_2X_3, $K_{sp} = 1.08 \times 10^{-23}$.

6. A particular saturated solution of silver chromate, Ag_2CrO_4, has $[Ag^+] = 5\times10^{-5}$ and $[CrO_4^{2-}] = 4.4\times10^{-4}$ M. What is value of K_{sp} for Ag_2CrO_4 ?

7. If the solubility product of silver oxalate is 5×10^{-10}, what will be the weight of $Ag_2C_2O_4$ in 2.5 litres of a saturated solution ?

8. Calculate the solubility of AgCl (s) in pure water and in 0.1 M NaCl at 25° C .
K_{sp} (AgCl) = 2.56×10^{-10}. Comment on the influence of $[Cl^-]$ on the solubility of AgCl.

9. The solubility product of AgCl in water is 1.5×10^{-10} . Calculate its solubility in 0.01 M NaCl aqueous solution .

10. The solubility product of SrF_2 in water is 8×10^{-10}. Calculate its solubility in 0.1 M, NaF aqueous solution.

11. The solubility of CaF_2 in water at 1518°C is 2×10^{-4} mole/litre. Calculate K_{sp} of CaF_2 and its solubility in 0.1M NaF solution.

12. The solubility product of $BaSO_4$ is 1.6×10^{-9} . Find out its solubility in ,

(i) pure water

(ii) 0.1 M $BaCl_2$.

Answer Key

DPP No. # 20

1. **(a)** (D) **(b)** (B) **2.** (B) **3.** (B) **4.** (C)

5. 10^{-5} mol L^{-1} **6.** 1.1×10^{-12}. **7.** 0.38 gm.

8. **(i)** 1.6×10^{-5} mol/lit. **(ii)** 2.56×10^{-9} mol/lit.

9. $s = 1.5 \times 10^{-8}$ mol/l^{-1} **10.** $s = 8 \times 10^{-8}$ M. **11.** $K_{sp} = 3.2 \times 10^{-11}$, $[Ca^{2+}] = 3.2 \times 10^{-9}$ mole/litre.

12. **(i)** 4×10^{-5} mole per litre **(ii)** 1.6×10^{-8} mol per litre.