46. A strong acid is titrated with weak base. At equivalence point, pH will be :

(A) < 7   **(B)** > 7   **(C)** = 0   **(D)** Cannot predict

47. The rapid change of $[OH^-]$ near the stoichiometric point of an acid base titration is the basis of indicator detection. pH of the solution is related to the ratio of the concentrations of the conjugate acid (HIn) and base (In⁻) forms of the indicator given by the expression. ▶

(A) $\log \dfrac{[In^-]}{[HIn]} = pK_{In} - pH$ **(B)** $\log \dfrac{[HIn]}{[In^-]} = pK_{In} - pH$

(C) $\log \dfrac{[HIn]}{[In^-]} = pH - pK_{In}$ **(D)** $\log \dfrac{[In^-]}{[HIn]} = pH - pK_{In}$

48. 50% neutralisation of a solution of formic acid $(K_a = 2 \times 10^{-4})$ with NaOH would result in a solution having a hydrogen ion concentration of : ▶

(A) 2×10^{-4} **(B)** 3.7   **(C)** 2.7   **(D)** 1.85

49. Which is the best choice for weak base-strong acid titration ?

(A) Methyl red   **(B)** Litmus   **(C)** Phenol red   **(D)** Phenolphthalein

50. Which of the following indicator works in the pH range $8 - 9.8$?

(A) Litmus   **(B)** Phenolphthalein

(C) Methyl red   **(D)** Methyl orange

51. A precipitate of AgCl is formed when equal volumes of the following are mixed $\left[K_{sp} \text{ for } AgCl = 10^{-10} \right]$

(A) 10^{-4} M $AgNO_3$ and 10^{-7} M HCl   **(B)** 10^{-5} M $AgNO_3$ and 10^{-6} M HCl ▶

(C) 10^{-4} M $AgNO_3$ and 10^{-4} M HCl   **(D)** 10^{-6} M $AgNO_3$ and 10^{-6} M HCl

52. The solubility of mercurous chloride in water will be given as :

(A) $K_{sp}\left(Hg_2Cl_2\right)$ **(B)** $\sqrt{K_{sp}(Hg_2Cl_2)/4}$

(C) $[K_{sp}(Hg_2Cl_2)/4]^{1/3}$ **(D)** $[K_{sp}(Hg_2Cl_2)]^{1/3}$

53. The solubility product of a salt AB is 1×10^{-8}. In a solution, in which concentration of A^+ is 10^{-3} M, AB will precipitate when the concentration of B⁻ will be : ▶

(A) 10^{-7} M   **(B)** 10^{-4} M   **(C)** 10^{-5} M   **(D)** 10^{-6} M
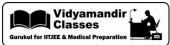
54. The solubility product of $CaSO_4$ is 2.4×10^{-5}. When 100 mL of 0.01 M $CaCl_2$ and 100 mL of 0.002 M Na_2SO_4 are mixed, then : ▶

(A) Na_2SO_4 will precipitate   **(B)** Both will precipitate

(C) $CaSO_4$ will precipitate   **(D)** None will precipitate

55. Why is pure NaCl precipitated when HCl gas is passed in saturated solution of NaCl ?

(A) Impurities dissolve in HCl

(B) The value of $[Na^+]$ and $[Cl^-]$ product becomes smaller than K_{sp} of NaCl

(C) The value of $[Na^+]$ and $[Cl^-]$ product becomes higher than K_{sp} of NaCl

(D) HCl dissolves in water

56. In 1L saturated solution of $AgCl[K_{sp}(AgCl) = 1.6 \times 10^{-10}]$,

0.1 mole of $CuCl[K_{sp}(CuCl) = 1.0 \times 10^{-6}]$ is added. The resultant concentration of Ag^+ in the solution is

1.6×10^{-x}. The value of 'x' is :

(A) 3   **(B)** 5   **(C)** 7   **(D)** 9

57. The solubility product (K_{sp}) of the following compound are given at 25°C

	Compound		K_{sp}		Compound		K_{sp}
I.	AgCl	**(i)**	1.1×10^{-10}	**III.**	PbCrO₄	**(iii)**	4.0×10^{-14}
II.	AgI	**(ii)**	1.0×10^{-16}	**IV.**	Ag₂CO₃	**(iv)**	8.0×10^{-12}

The most soluble and least soluble compound are :

(A) AgCl & PbCrO₄   **(B)** AgI & Ag₂CO₃

(C) AgCl & Ag₂CO₃   **(D)** Ag₂CO₃ & AgI

58. H₂S is passed into one dm³ of a solution containing 0.1 mole Zn^{2+} and 0.01 mole Cu^{2+} till the sulphide ion concentration reaches 8.1×10^{-10} moles. Which one of the following statements is true ? [K_{sp} or ZnS and CuS are 3×10^{-22} and 8×10^{-36} respectively]

(A) Only ZnS precipitates   **(B)** Both CuS and ZnS precipitates

(C) Only CuS precipitates   **(D)** No precipitation occurs

59. 1 dm³ solution containing 10^{-5} moles each of Cl⁻ ions and CrO_4^{2-} ions is treated with 10^{-4} moles of silver nitrate. Which one of the following observation is made ?

$[K_{sp}Ag_2CrO_4 = 4 \times 10^{-12}]$; $[K_{sp}AgCl = 1 \times 10^{-10}]$

(A) Precipitation does not occur

(B) Silver chromate gets precipitated first

(C) Silver chloride gets precipitated

(D) Both silver chromate and silver chloride start, precipitating simultaneously

60. Solid Ba(NO₃)₂ is gradually dissolved in a 1.0×10^{-4} M Na_2CO_3 solution. At what concentration of Ba^{2+} will a precipitate begin to form ? (K_{sp} for $BaCO_3 = 5.1 \times 10^{-9}$)

(A) 4.1×10^{-5} M   **(B)** 5.1×10^{-5} M   **(C)** 8.1×10^{-8} M   **(D)** 8.1×10^{-7} M