

PREPARATION OF SOLUTIONS (CONCENTRATIONS)

- 1- The mw of Na_2CO_3 is : Na=23, O=16, C=12
 - A) 140
 - B) 106
 - C) 96
 - D) 100
 - E) 60

- 2- How many grams of Na_2CO_3 in 3 moles,
(mw = 106)

A) 318

B) 0.028

C) 134

D) 201

E) 67

- 3- Calculate the normal concentration (N) of 0.1 M solution of HCl
- A) 0.2 N
- B) 0.3 N
- C) 0.05 N
- D) 0.1 N

4- The eq.wt of H_3PO_4 (mw=98) is:

A) 98

B) 49

C) 32.7

D) 196

E) 294

- 5- 2.5 g of Na_2SO_4 (mw = 106) has been dissolved in water and the volume was completed to 500 mL , calculate the followings :

The molar concentration of Na_2SO_4

- A) 5
- B) 500
- C) 0.5
- D) 0.05

Unit3: STOICHIOMETRY AND EQUILIBRIUM

The limiting reactant is:

- A) present in lower of moles
- B) present in higher of moles
- C) present in lower of mass
- D) present in lower of mass

Unit3: STOICHIOMETRY AND EQUILIBRIUM

The limiting reactant is:

- A) It is completely used up in the reaction
- B) It is not completely used up in the reaction

Unit3: STOICHIOMETRY AND EQUILIBRIUM

In chemical equilibrium:

- A) rate (forward = reverse)
- B) rate (forward < reverse)
- C) rate (forward > reverse)

Unit3: STOICHIOMETRY AND EQUILIBRIUM

If $K_{eq} \gg 1$ ($M=0.1$ of product)

A) Product $0.1-x$

B) product $0.1+x$

Unit3: STOICHIOMETRY AND EQUILIBRIUM

If $K_{eq} \ll 1$ (**$M=0.1$ of product**)

A) Product $0.1-x$

B) Product x

Unit3: STOICHIOMETRY AND EQUILIBRIUM

Calculate the molar concentration of $[H^+]$ in 0.16 M solution of dichloroacetic acid $Cl_2CHCOOH$

($K_a = 5 \times 10^{-3}$). The concentration of the acid is initial (before dissociation)



The concentration of Cl_2CHCOO and H^+

- A) $0.16-x$
- B) $0.16+x$
- C) x

Unit3: STOICHIOMETRY AND EQUILIBRIUM

Calculate the molar concentration of $[\text{H}^+]$ in 0.16 M solution of dichloroacetic acid Cl_2CHCOOH ($K_a = 5 \times 10^{-3}$). The concentration of the acid is initial (before dissociation)



The concentration of Cl_2CHCOOH and H^+

- A) $0.16-x$
- B) $0.16+x$
- C) x

Unit3: STOICHIOMETRY AND EQUILIBRIUM

Calculate the molar concentration of $[\text{H}^+]$ in 0.16 M solution of dichloroacetic acid Cl_2CHCOOH ($K_a = 5 \times 10^{-3}$). The concentration of the acid is initial (before dissociation)



The value of x

- A) 5×10^{-3}
- B) 0.16
- C) 5.9×10^3

Unite 4: ACID – BASE EQUILIBRIUM

Acid and base strong

A) high conc.

B) high vol.

C) Completely dissociate

Unite 4: ACID – BASE EQUILIBRIUM

pH

A) 1-7

B) 1-14

C) 7-14

D) 0-14

Unite 4: ACID – BASE EQUILIBRIUM

POH

A) 1-7

B) 1-14

C) 7-14

D) 0-14

Unite 4: ACID – BASE EQUILIBRIUM

pH of HCl(0.01M)

A) pH= 1

B) pH=2

pH= 3

Unite 4: ACID – BASE EQUILIBRIUM

pOH of $\text{Ba}(\text{OH})_2$ (0.01M)

A) pOH= 0.7

B) pOH=1.7

C) pOH= 3

Unite 4: ACID – BASE EQUILIBRIUM

pOH of NaOH(0.03M)

A) pOH= 1

B) pOH=1.5

pOH= 3

pOH of HCl(0.01M)

A) pOH= 2

B) pOH=5

pOH= 12

Unite 4: ACID – BASE EQUILIBRIUM

pH of strong acid :

A) $pH = -\log [H^+]$

B) $pH = -\log \sqrt{K_a C_a}$

C) $pH = -\log \sqrt{K_b C_b}$

Unite 4: ACID – BASE EQUILIBRIUM

pH of strong base :

A) $pH = -\log [H^+]$

B) $pOH = -\log [OH^-]$

C) $pH = -\log \sqrt{K_a C_a}$

Unite 4: ACID – BASE EQUILIBRIUM

pH of weak acide :

A) $pH = -\log [H^+]$

B) $pOH = -\log [OH^-]$

C) $pH = -\log \sqrt{K_a C_a}$

Unite 4: ACID – BASE EQUILIBRIUM

pH of weak base:

A) $pH = -\log [H^+]$

B) $pH = -\log \sqrt{K_a C_a}$

C) $pH = -\log \sqrt{K_b C_b}$

Unite 4: ACID – BASE EQUILIBRIUM

K_w :

A) $K_w = [H^+] + [OH^-]$

B) $K_w = [H^+][OH^-]$

C) $K_w = [H^+] - [OH^-]$

D) $K_w = \frac{[H^+]}{[OH^-]}$

Unite 4: ACID – BASE EQUILIBRIUM

pK_w

A) $pK_w = [H^+][OH^-]$

B) $pK_w = [H^+] + [OH^-]$

C) $pK_w = pH + pOH$

D) $pK_w = pH - pOH$

Unite 4: ACID – BASE EQUILIBRIUM

Calculate the pH of. 0.5 M solution of NH_4Cl ?

$$K_b (\text{NH}_3) = 1.75 \times 10^{-5}$$

A) $pH = -\log [H^+]$

B) $pH = -\log \sqrt{K_a C_a}$

C) $pH = -\log \sqrt{\frac{K_w C_s}{K_b}}$

D) $pH = -\log \sqrt{K_{1a} C_s}$

Unite 4: ACID – BASE EQUILIBRIUM

Calculate the pH of. 0.5 M solution of NH_4Cl ?

$$K_b (\text{NH}_3) = 1.75 \times 10^{-5}$$

A)

$$pH = -\log [H^+]$$

B) $pH = -\log \sqrt{K_a C_a}$

C) $pH = -\log \sqrt{\frac{K_w C_s}{K_b}}$

D) $pH = -\log \sqrt{K_{1a} C_s}$

Unite 4: ACID – BASE EQUILIBRIUM

Calculate the pH of. 0.5 M solution of NH_4Cl ?

$$K_b (\text{NH}_3) = 1.75 \times 10^{-5}$$

- A) pH = 2.1
- B) pH = 4.8
- C) pH = 7
- D) pH = 9.6

Unite 4: ACID – BASE EQUILIBRIUM

Calculate the pH of 0.2 M solution of $\text{Ba}(\text{OH})_2$

A) $\text{pOH} = 12.1$

B) $\text{pOH} = 8.9$

C) $\text{pOH} = 5.5$

D) $\text{pOH} = 0.4$

Unite 4: ACID – BASE EQUILIBRIUM

Calculate the pH of 0.2 M solution of $\text{Ba}(\text{OH})_2$ •

A) 9.6

B) 11.6

C) 13.6

Unite 4: ACID – BASE EQUILIBRIUM

pH of salt (strong acid+ weak base)

A) $pH=7$

B) $pH = -\log\sqrt{K_a C_a}$

C) $pH = -\log [H^+]$

D) $pH = -\log \sqrt{\frac{K_w C_s}{K_b}}$

Unite 4: ACID – BASE EQUILIBRIUM

pH of salt (strong acid+ strong base)

A) pH=7

B) $pH = -\log \sqrt{\frac{K_w C_s}{K_b}}$

C) $pOH = -\log \sqrt{\frac{k_w c_s}{k_a}}$

pH of salt (strong base + weak acid)

A) pH=7

B) $pH = -\log \sqrt{\frac{K_w C_s}{K_b}}$

C) $pOH = -\log \sqrt{\frac{k_w c_s}{k_a}}$

Unite 5: BUFFER SOLUTIONS

pH of $\text{CH}_3\text{COOH} / \text{CH}_3\text{COONa}$

$$\text{A) } pOH = pK_b + \log \frac{C_s}{C_b}$$

$$\text{B) } pH = pK_a + \log \frac{C_s}{C_a}$$

$$\text{C) } pOH = -\log \sqrt{\frac{k_w C_s}{k_a}}$$

Unite 5: BUFFER SOLUTIONS

pH of **NH₄OH / NH₄Cl**

$$A) pOH = pK_b + \log \frac{C_s}{C_b}$$

$$B) pH = pK_a + \log \frac{C_s}{C_a}$$

$$C) pOH = -\log \sqrt{\frac{k_w C_s}{k_a}}$$

Unite 5: BUFFER SOLUTIONS

Calculate the pH of a solution containing 0.1 M Na_2CO_3 and 0.2 M NaHCO_3 ? $K_{a2}(\text{H}_2\text{CO}_3) = 4.7 \times 10^{-11}$.

- A) pH= 5
- B) pH= 8
- C) pH=10

Unite 5: BUFFER SOLUTIONS

Calculate the pH of a solution resulting from adding 4 mL of 0.2 M of NaOH solution to 16 mL of a buffer solution containing 0.1 M CH_3COOH ($K_a = 1.8 \times 10^{-5}$) and 0.2 M CH_3COONa

The number of mmol CH_3COOH

- A) 0.8 mmol
- B) 1.6 mmol
- C) 4 mmol

Unite 5: BUFFER SOLUTIONS

Calculate the pH of a solution resulting from adding 4 mL of 0.2 M of NaOH solution to 16 mL of a buffer solution containing 0.1 M CH₃COOH ($K_a = 1.8 \times 10^{-5}$) and 0.2 M CH₃COONa

The number of mmol NaOH

- A) 0.8 mmol
- B) 1.6 mmol
- C) 4 mmol

Unite 5: BUFFER SOLUTIONS

Calculate the pH of a solution resulting from adding 4 mL of 0.2 M of NaOH solution to 16 mL of a buffer solution containing 0.1 M CH_3COOH ($K_a = 1.8 \times 10^{-5}$) and 0.2 M CH_3COONa

The number of mmol CH_3COONa

- A) 0.8 mmol
- B) 1.6 mmol
- C) 4 mmol

Unite 5: BUFFER SOLUTIONS

Calculate the pH of a solution resulting from adding 4 mL of 0.2 M of NaOH solution to 16 mL of a buffer solution containing 0.1 M CH_3COOH ($K_a = 1.8 \times 10^{-5}$) and 0.2 M CH_3COONa

The pH of a solution

- A) pH = 2
- B) pH = 5.4
- C) pH = 9.4

Unite 6: INTRODUCTION TO VOLUMETRIC ANALYSIS

In the case of titrating 10 mL solution of 0.1 M of Cl^- (in the conical flask) by 0.2 M solution of Ag^+ (in the burette) , calculate $V_{\text{eq.p}}$ of Ag^+ solution

A) 2.5 mL

B) 5 mL

C) 10 mL

Unite 6: INTRODUCTION TO VOLUMETRIC ANALYSIS

In the case of titrating 10 mL of 0.1 M of H_2SO_4 solution by 0.2 M of NaOH solution , calculate $V_{\text{eq.p}}$ of NaOH solution

A) 2.5 mL

B) 5 mL

C) 10 mL

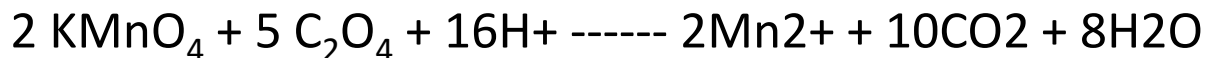
Unite 6: INTRODUCTION TO VOLUMETRIC ANALYSIS

Endpoint is

- A) The same (equal) equivalence point
- B) Before equivalence point
- C) After equivalence point

Unite 6: INTRODUCTION TO VOLUMETRIC ANALYSIS

300 mg of a $\text{Na}_2\text{C}_2\text{O}_4$ (mw = 134) 95 %w/w pure reagent was transferred to a titration conical flask . After adding acid solution and a suitable indicator , $\text{C}_2\text{O}_4^{2-}$ was titrated with KMnO_4 unknown solution according to the following titration reaction equation :

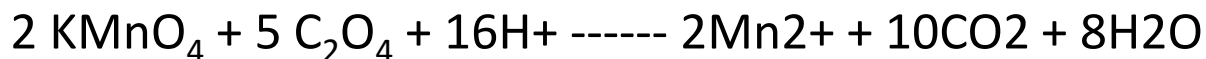


If the volume of KMnO_4 solution at the equivalent point was 34 mL , calculate the molarity of KMnO_4 solution, the pure wieght of $\text{Na}_2\text{C}_2\text{O}_4$

- A) 300 mg
- B) 285 mg
- C) 31.67 mg

Unite 6: INTRODUCTION TO VOLUMETRIC ANALYSIS

300 mg of a $\text{Na}_2\text{C}_2\text{O}_4$ (mw = 134) 95 %w/w pure reagent was transferred to a titration conical flask . After adding acid solution and a suitable indicator , $\text{C}_2\text{O}_4^{2-}$ was titrated with KMnO_4 unknown solution according to the following titration reaction equation :

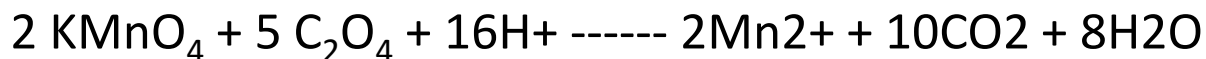


If the volume of KMnO_4 solution at the equivalent point was 34 mL , calculate the molarity of KMnO_4 solution, the moles of $\text{Na}_2\text{C}_2\text{O}_4$

- A) 5.61 mol
- B) 2.12 mol
- C) 0.85 mol

Unite 6: INTRODUCTION TO VOLUMETRIC ANALYSIS

300 mg of a $\text{Na}_2\text{C}_2\text{O}_4$ (mw = 134) 95 %w/w pure reagent was transferred to a titration conical flask . After adding acid solution and a suitable indicator , $\text{C}_2\text{O}_4^{2-}$ was titrated with KMnO_4 unknown solution according to the following titration reaction equation :



If the volume of KMnO_4 solution at the equivalent point was 34 mL , calculate the molarity of KMnO_4 solution, the moles of KMnO_4

- A) 5.61 mol
- B) 2.12 mol
- C) 0.85 mol

Unite 6: INTRODUCTION TO VOLUMETRIC ANALYSIS

750 mg of a sample containing iron ($a_w = 55.85$) was transferred into a titration conical flask and all iron was converted to Fe^{3+} , then unknown excess of KI was added and the following reaction was occurred



The iodine I_2 formed was titrated with 0.075 M of $Na_2S_2O_3$ solution using starch as indicator according to the following reaction equation :

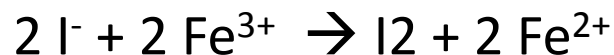


mmol of $S_4O_6^{2-}$

- A) 18.51
- B) 1.39
- C) 4.77

Unite 6: INTRODUCTION TO VOLUMETRIC ANALYSIS

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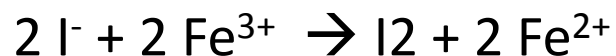


mmol of I_2

- A) 18.51
- B) 1.39
- C) 0.69

Unite 6: INTRODUCTION TO VOLUMETRIC ANALYSIS

750 mg of a sample containing iron ($a_w = 55.85$) was transferred into a titration conical flask and all iron was converted to Fe^{3+} , then unknown excess of KI was added and the following reaction was occurred



The iodine I_2 formed was titrated with 0.075 M of $\text{Na}_2\text{S}_2\text{O}_3$ solution using starch as indicator according to the following reaction equation :



mmol of Fe^{3+}

- A) 18.51
- B) 1.39
- C) 0.69

Unite 6: INTRODUCTION TO VOLUMETRIC ANALYSIS

1.782 g of a sample containing Cr^{6+} ($\text{aw} = 52$) is dissolved in a conical flask . An excess of 1.5 g of Fe^{2+} ($\text{aw} = 55.85$) are added which is oxidized to Fe^{3+} during its reduction of Cr^{6+} to Cr^{3+} . The excess Fe^{2+} is titrated with 0.05 N of $\text{K}_2\text{Cr}_2\text{O}_7$ and was found to require 10 mL at the equivalent point . Calculate the %w/w percentage of Cr^{6+} in the sample .

m.eq. of $\text{K}_2\text{Cr}_2\text{O}_7$

- A) 0.05 m.eq
- B) 0.5 m.eq
- C) 1.5 m.eq

Unite 6: INTRODUCTION TO VOLUMETRIC ANALYSIS

1.782 g of a sample containing Cr^{6+} (aw = 52) is dissolved in a conical flask . An excess of 1.5 g of Fe^{2+} (aw = 55.85) are added which is oxidized to Fe^{3+} during its reduction of Cr^{6+} to Cr^{3+} . The excess Fe^{2+} is titrated with 0.05 N of $\text{K}_2\text{Cr}_2\text{O}_7$ and was found to require 10 mL at the equivalent point . Calculate the %w/w percentage of Cr^{6+} in the sample

m.eq. of Fe^{2+} (excess) which reacted with $\text{K}_2\text{Cr}_2\text{O}_7$

A) 0.05 m.eq

B) 0.5 m.eq

C) 1.5 m.eq

Unite 6: INTRODUCTION TO VOLUMETRIC ANALYSIS

1.782 g of a sample containing Cr^{6+} ($\text{aw} = 52$) is dissolved in a conical flask . An excess of 1.5 g of Fe^{2+} ($\text{aw} = 55.85$) are added which is oxidized to Fe^{3+} during its reduction of Cr^{6+} to Cr^{3+} . The excess Fe^{2+} is titrated with 0.05 N of $\text{K}_2\text{Cr}_2\text{O}_7$ and was found to require 10 mL at the equivalent point . Calculate the %w/w percentage of Cr^{6+} in the sample .

m.eq. of Fe^{2+} total

- A) 0.05 m.eq
- B) 0.78 m.eq
- C) 26.85 m.eq

Unite 6: INTRODUCTION TO VOLUMETRIC ANALYSIS

1.782 g of a sample containing Cr^{6+} ($\text{aw} = 52$) is dissolved in a conical flask . An excess of 1.5 g of Fe^{2+} ($\text{aw} = 55.85$) are added which is oxidized to Fe^{3+} during its reduction of Cr^{6+} to Cr^{3+} . The excess Fe^{2+} is titrated with 0.05 N of $\text{K}_2\text{Cr}_2\text{O}_7$ and was found to require 10 mL at the equivalent point . Calculate the %w/w percentage of Cr^{6+} in the sample .

m.eq. of Fe^{2+} which reacted with Cr^{6+}

- A) 0.05 m.eq
- B) 0.78 m.eq
- C) 26.36 m.eq

Unite 6: INTRODUCTION TO VOLUMETRIC ANALYSIS

1.782 g of a sample containing Cr^{6+} ($\text{aw} = 52$) is dissolved in a conical flask . An excess of 1.5 g of Fe^{2+} ($\text{aw} = 55.85$) are added which is oxidized to Fe^{3+} during its reduction of Cr^{6+} to Cr^{3+} . The excess Fe^{2+} is titrated with 0.05 N of $\text{K}_2\text{Cr}_2\text{O}_7$ and was found to require 10 mL at the equivalent point . Calculate the %w/w percentage of Cr^{6+} in the sample .

m.eq. of Cr^{6+}

- A) 0.05 m.eq
- B) 0.78 m.eq
- C) 26.36 m.eq

Unite 6: INTRODUCTION TO VOLUMETRIC ANALYSIS

1.782 g of a sample containing Cr^{6+} ($\text{aw} = 52$) is dissolved in a conical flask . An excess of 1.5 g of Fe^{2+} ($\text{aw} = 55.85$) are added which is oxidized to Fe^{3+} during its reduction of Cr^{6+} to Cr^{3+} . The excess Fe^{2+} is titrated with 0.05 N of $\text{K}_2\text{Cr}_2\text{O}_7$ and was found to require 10 mL at the equivalent point . Calculate the %w/w percentage of Cr^{6+} in the sample .

mass of Cr^{6+}

- A) 17.33 mg
- B) 456.91 mg
- C) 630.02 mg

Unite 6: INTRODUCTION TO VOLUMETRIC ANALYSIS

1.782 g of a sample containing Cr^{6+} ($aw = 52$) is dissolved in a conical flask . An excess of 1.5 g of Fe^{2+} ($aw = 55.85$) are added which is oxidized to Fe^{3+} during its reduction of Cr^{6+} to Cr^{3+} . The excess Fe^{2+} is titrated with 0.05 N of $\text{K}_2\text{Cr}_2\text{O}_7$ and was found to require 10 mL at the equivalent point . **Calculate the %w/w percentage of Cr^{6+} in the sample .**

- A) 17.33 %
- B) 40.91 %
- C) 25.60%

Unite 6: INTRODUCTION TO VOLUMETRIC ANALYSIS

10 mL of 0.1 M of analyte A were titrated with 0.2 M of titrant B according to the following titration reaction equation :



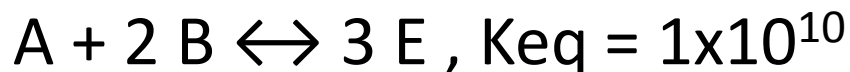
Calculate the molar concentration of each [A] , [B] and [E] in the conical flask after the following additions of the titrant B solution : (1) 5 mL (2) 10 mL (3) 15 mL

calculate the **volume of the titrant B** solution at the equivalent point

- A) 5 mL
- B) 2.5mL
- C) 10 mL

Unite 6: INTRODUCTION TO VOLUMETRIC ANALYSIS

10 mL of 0.1 M of analyte A were titrated with 0.2 M of titrant B according to the following titration reaction equation :



Calculate the molar concentration of each [A] , [B] and [E] in the conical flask after the following additions of the titrant B solution : (1) 3 mL (2) 10 mL (3) 15 mL

calculate the **molar concentration of [E]**

A) 1 mL

B) 0.07mL

C) 0.1 mL

Unite 6: INTRODUCTION TO VOLUMETRIC ANALYSIS

10 mL of 0.1 M of analyte A were titrated with 0.2 M of titrant B according to the following titration reaction equation :



Calculate the molar concentration of each [A] , [B] and [E] in the conical flask after the following additions of the titrant B solution : (1) 3 mL (2) 10 mL (3) 15 mL

calculate the **molar concentration of [A]**

A) 1 M

B) 0.03 M

C) 0.05 M

Unite 6: INTRODUCTION TO VOLUMETRIC ANALYSIS

10 mL of 0.1 M of analyte A were titrated with 0.2 M of titrant B according to the following titration reaction equation :



Calculate the molar concentration of each [A] , [B] and [E] in the conical flask after the following additions of the titrant B solution : (1) 3 mL (2) 10 mL (3) 15 mL

calculate the **molar concentration of [B]**

A) 0.3 M

B) 1.8×10^{-6} M

C) 8.3×10^{-7}

Unit7: ACID – BASE TITRATION CURVES

If 10 mL of 0.1 M CH_3COOH ($K_a = 1.8 \times 10^{-5}$) is titrated with 0.2 M NaOH solution, calculate the pH of the titration solution in the conical flask after the addition of the following volumes of NaOH solution : **V.eq.p**

- A) 5
- B) 10
- C) 15

Unit7: ACID – BASE TITRATION CURVES

If 10 mL of 0.1 M CH_3COOH ($K_a = 1.8 \times 10^{-5}$) is titrated with 0.2 M NaOH solution, calculate the pH of the titration solution in the conical flask after the addition of the following volumes of NaOH solution : **3mL**

- A) 2.91
- B) 4.96
- C) 11.51

Unit7: ACID – BASE TITRATION CURVES

If 10 mL of 0.1 M CH_3COOH ($K_a = 1.8 \times 10^{-5}$) is titrated with 0.2 M NaOH solution, calculate the pH of the titration solution in the conical flask after the addition of the following volumes of NaOH solution : **5mL**

- A) 5.2
- B) 8.8
- C) 11.51

Unit7: ACID – BASE TITRATION CURVES

If 10 mL of 0.1 M CH_3COOH ($K_a = 1.8 \times 10^{-5}$) is titrated with 0.2 M NaOH solution, calculate the pH of the titration solution in the conical flask after the addition of the following volumes of NaOH solution : **10mL**

- A) 2.91
- B) 1.30
- C) 12.71

Unit7: ACID – BASE TITRATION CURVES

- A) if $pK_a = 3$, so, sharper the region of the curve near the equivalent point
- B) if $pK_a = 7$, so, sharper the region of the curve near the equivalent point
- C) if $pK_a = 10$, so, sharper the region of the curve near the equivalent point

Unite 8: ACID – BASE TITRATION INDICATORS

At a low pH, the human can distinguish the acidic color if:

A) $\frac{[In]}{[HIn]} = \frac{10}{1}$

B) $\frac{[HIn]}{[In]} = \frac{10}{1}$

C) $\frac{[In]}{[HIn]} = \frac{20}{1}$

Unite 8: ACID – BASE TITRATION INDICATORS

At a high pH, the human can distinguish the acidic color if:

$$\text{A) } \frac{[In]}{[HIn]} = \frac{10}{1}$$

$$\text{B) } \frac{[HIn]}{[In]} = \frac{10}{1}$$

$$\text{C) } \frac{[In]}{[HIn]} = \frac{20}{1}$$

Unite 8: ACID – BASE TITRATION INDICATORS

At low pH (acidic), The pH of indicator is :

A) $\text{pH}_{\text{In}} = \text{pK}_{\text{HIn}} - 1$

B) $\text{pH}_{\text{In}} = \text{pK}_{\text{HIn}} + 1$

C) $\text{pK}_{\text{HIn}} = \text{pH}_{\text{In}} - 1$

Unite 8: ACID – BASE TITRATION INDICATORS

The Indicator's Range is:

A) $\Delta pK_{\text{HIn}} = pK_{\text{HIn}} \pm 1$

B) $\Delta pK_{\text{HIn}} = \text{pH}_{\text{In}} \pm 1$

C) $\Delta \text{pH}_{\text{In}} = pK_{\text{HIn}} \pm 1$

Unite 8: ACID – BASE TITRATION INDICATORS

How do the following indicators behave with the titration of 10 mL of 0.05 M of the weak acid HA ($K_a = 1 \times 10^{-5}$) with 0.1 M NaOH :

(1) $pK_{In} = 7$ (2) $pK_{In} = 9$ (3) $pK_{In} = 11$

Calculate $V_{eq.p.}$

A) 2.5 mL

B) 5mL

C) 7.5mL

Unite 8: ACID – BASE TITRATION INDICATORS

How do the following indicators behave with the titration of 10 mL of 0.05 M of the weak acid HA ($K_a = 1 \times 10^{-5}$) with 0.1 M NaOH :

(1) $pK_{In} = 7$ (2) $pK_{In} = 9$ (3) $pK_{In} = 11$

Calculate the pH at eq.p.

A) 4.7 mL

B) 9.3mL

C) 12.5mL

Unite 8: ACID – BASE TITRATION INDICATORS

How do the following indicators behave with the titration of 10 mL of 0.05 M of the weak acid HA ($K_a = 1 \times 10^{-5}$) with 0.1 M NaOH :

(1) $pK_{In} = 7$ (2) $pK_{In} = 9$ (3) $pK_{In} = 11$

The suitable indicatore is

A)) $pK_{In} = 7$

B) $pK_{In} = 9$

C) $pK_{In} = 11$

Unite 8: ACID – BASE TITRATION INDICATORS

How do the following indicators behave with the titration of 20 mL of 0.1 M of NH_3 ($K_b \approx 2 \times 10^{-5}$) with 0.4 M HCl :

(1) $\text{pK}_{\text{In}} = 3$ (2) $\text{pK}_{\text{In}} = 5$ (3) $\text{pK}_{\text{In}} = 7$

Calculate $V_{\text{eq.p.}}$

A) 2.5 mL

B) 5mL

C) 7.5mL

Unite 8: ACID – BASE TITRATION INDICATORS

How do the following indicators behave with the titration of 20 mL of 0.1 M of NH_3 ($K_b \approx 2 \times 10^{-5}$) with 0.4 M HCl :

(1) $\text{pK}_{\text{In}} = 3$

(2) $\text{pK}_{\text{In}} = 5$

(3) $\text{pK}_{\text{In}} = 7$

Calculate the pH at eq.p.

A) 11.9

B) 9.8

C) 5.2

Unite 8: ACID – BASE TITRATION INDICATORS

How do the following indicators behave with the titration of 20 mL of 0.1 M of NH_3 ($K_b \approx 2 \times 10^{-5}$) with 0.4 M HCl :

(1) $\text{p}K_{\text{In}} = 3$

(2) $\text{p}K_{\text{In}} = 5$

(3) $\text{p}K_{\text{In}} = 7$

The suitable indicator is

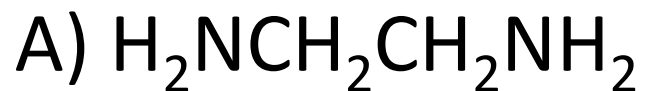
A) $\text{p}K_{\text{In}} = 3$

B) $\text{p}K_{\text{In}} = 5$

C) $\text{p}K_{\text{In}} = 7$

Unite 9: **COMPLEX FORMATION TITRATION**

Example of unidentate



Unite 9: **COMPLEX FORMATION TITRATION**

The charge of complex Fe^{3+} , $\text{Fe}(\text{CN})_6$

- A) 3+
- B) 3-
- C) 6-
- D) 6+

Unite 9: **COMPLEX FORMATION TITRATION**

Calculate the molar concentration of $[\text{CN}^-]$ in a solution of $\text{Cu}(\text{CN})_4^{2-}$ ($K_d = 5.2 \times 10^{-28}$) prepared by dissolving 0.05 mole of the complex in water and completing the volume to one liter

A) 2.52×10^{-5}

B) 5.63×10^{-2}

C) 32.2×10^{-28}