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SARDAR PATEL UNIVERSITY

B. Sc. (Third Semester Examination)

US03EICH01 – Traditional Methods of Analysis

Date: 15/06/22, Wednesday Time: 12.00 to 2.00 pm Total Marks : 70

Q.1. **Choose the correct option for the following:** [10]

i. The substance used for the detection of end point by color change is...
(a)Strong acid
(b) buffer
(c)reagent
(d) none of these

ii. Which solution is used to maintain constant pH, if a small amount of acid or base is added to it?
(a) strong acid
(b) strong base
(c) buffer
(d) indicator

iii. Mixture of ammonium chloride & ammonium hydroxide is----------.
(a) complexing agent
(b) indicator
(c)basic buffer
(d)acidic buffer

iv. A chelating agent can be....
(a) monodentate
(b) Polydentate
(c)electron pair acceptor
(d) all of these

v. Which of the following acid is added in the titration of $KMnO_4$?
(a)H_2SO_4
(b) HCl
(c) HNO_3
(d) phosphoric acid

vi. Which of the following is a redox titration?
(a) titration of HCl with NaOH
(b) titration of CH_3COOH with NaOH
(c) titration of oxalic acid with $KMnO_4$
(d) all of these

vii The temporary hardness of water due to calcium bicarbonate can be removed by
(a)adding calcium chloride
(b)boiling
(c)filtration
(d)adding HCl

(P.T.O.)

(1)

viii Indicator used to determine sulphate in hard water by EDTA titration is ___
(a)phenolphthalein
(b) diphenyl amine
(c) Eriochrome black T
(d) Eosin

ix Molarity is
(a) number of moles solute dissolved per liter of solution
(b) number of moles of solute dissolved per liter of solvent
(c) number of moles of solute dissolved per Kg of solvent
(d) number of moles of solute dissolved per Kg of solution.

x Oxidation involves
(a)gain of electrons
(b)addition of hydrogen
(c)decrease in oxidation number
(d)loss of electrons

Q.2. State TRUE or FALSE **[08]**

i. Phenolphthalein is used in strong acid and strong base titration.
ii. The point at which indicator does not changes its color is called end point.
iii. Bidentate ligand has two groups capable of forming two bonds with the central atom.
iv. Ligand is not lewis base in furnishing electrons to the central metal ion to form a complex.
v. Reduction is gain of electrons.
vi. Nernst equation does not give information of formal potential.
vii Total hardness is due to calcium and magnesium ions.
viii Any toxic material in water which does not change either its chemical or physical properties cause water pollution.

Q.3. Short answer questions. (Attempt any TEN) **[20]**

i. Define: Titrant and Titrand.
ii. Define: Equivalence point and End point.
iii. Define: Chelating agent &Stability constant.
iv. Discuss back titration used for EDTA titration.
v. Define: Oxidizing agent & Voltage
vi. Sulphuric acid is used for potassium permanganate titration in place of hydrochloric acid. Give reason.
vii Distinguish clearly between hard water and soft water.
viii Explain the principle of measurement of electrical conductivity of water.
ix Give method and calculation to determine chloride in water.
x Write the conditions fulfilled by common titrimetric methods of analysis.
xi Differentiate: Complex salt and Chelate.
xii Distinguish clearly between oxidation and reduction with example.

Q.4 **Long Answer Questions. (ATTEMPT ANY FOUR)** [32]

i. By taking example of strong acid and strong base titration, discuss the neutralization curve. Give color change range of some indicators. [08]

ii. Show that at the color change interval, pH of the system is pH= $pK_{In} \pm 1$. Also discuss desirable properties of primary standard solution. [08]

iii. Explain stability constant and formation of complex ion by taking proper example and how will you determine hardness (calcium and magnesium) of water samples? [08]

iv. What are the requirements for metal ion indicator for use in visual detection of end point? Explain working of metal ion indicator for EDTA titration. [08]

v. Explain titration curve for iron (II) &cerium (IV) in detail. [08]

vi. Write in detail on internal redox indicators, explaining working of Diphenyl amine indicator. [08]

vii What do you understand by water pollution? Classify the types of water pollution. Describe the water pollutants and their effects. [08]

viii Discuss the method to analyze the presence of color in water sample. Discuss the method to analyze the presence of total dissolved solids in water sample. [08]

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