

RAMAKRISHNA MISSION VIDYAMANDIRA

(Residential Autonomous College affiliated to University of Calcutta)

B.A./B.Sc. FIFTH SEMESTER EXAMINATION, MARCH 2022

THIRD YEAR [BATCH 2019-22]

CHEMISTRY (HONOURS)

Paper : DSE2

Date : 05/03/2022

Time : 11 am – 1 pm

Full Marks : 50

[Attempt one question from each group]

Unit –I

[13 marks]

1. a) What are the common error in Iodometry and iodimetry? How can you minimize the error? [2+2]
b) Zinc acetate is a primary standard substance, yet its aqueous solution is prepared in some buffer medium, comment. [2]
c) Name the common indicator used in Iodometric/iodimetric titration. Why the indicator is used near the end point and in cold condition? [1+2+2]
d) Explain the function of buffer in Complexometric titration. [2]
2. a) What is argentometry? Using absorption indicator how can you estimate chloride ion, give mechanisms. What are the advantage and disadvantages of use absorption indicator? [1+2+2+2]
b) How can you estimate Ca^{2+} using EBT indicator? [2]
c) potassium bi-iodate is a primary standard substance, justify. Determine its Oxidimetric and Acidimetric equivalent weight. [2+2]

Unit –II

[12 marks]

3. a) What is the composition of brass? How can you dissolve brass? Give all the reaction with balance equation. Give the procedure for the estimation of Zn in brass. [1+2+2+3]
b) What do you mean by Gravimetry and Gravimetric factor? Give the scheme for the Gravimetric estimation of Zn. [2+2]
4. a) What is Co-precipitate and post-precipitate? Give example of each, what are the basic differences between them? How can you minimize Co-precipitate and Post-precipitate? [1+1+1+1+2+2]
b) End point of permanganometric titration is not stable, explain with reason. In permanganometric estimation of Fe^{3+} , Z-R reagent is required. What is the function Z-R reagent in this titration? [2+2]

Unit –III

[13 marks]

5. a) The percentage of a constituent A in a compound AB were found to be 48.32, 48.36, 48.23, 48.11, 48.38 percent. What would be the Relative standard deviation and coefficient of variation value?
b) What would be the values of following digits when rounded off to four significant figures 9.674509 and 9.7665
c) What is Winkler's method and its application?
d) What are the measures you follow when you have to separate two compounds with very small polarity difference through column chromatography?
e) A large number of fish are suddenly found floating dead on a lake. There is no evidence of toxic dumping but you found an abundance of phytoplankton. Suggest a reason for the death of fish. [4+2+3+2+2]

6. a) What is meant by COD explain in brief.
 b) How many significant figures are present in the following Number:
 .0025, .0205, .205 and 25.0
 c) How analytically one can detect and estimate small amount of Arsenic (As) in a water sample?
 Explain with proper example.
 d) Find the variance, standard deviation and range of the highest temperatures recorded in eight specific states:
 114, 112, 120, 134, 100, 110, 105, 126
 e) What is Resin? How does it use to prepare concentrated ion solution from a dilute solution?
- [2+2+3+4+2]

Unit –IV

[12 marks]

7. a) Give example for each kind mentioned here: 0D, 1D, 2D & 3D nanomaterials.
 b) Write names of various types of processes those are responsible for formation of self-assembly of nanomaterials.
 c) Briefly discuss about the process of preparation of gold nanoparticles (Au NPs).
 d) Quantum dots (Qdots) are made up of which type of materials?
 e) Discuss the working principle (how AAS works) of Flame Atomic Absorption Spectrometer with a diagrammatic representation.
 f) A sample chamber having absorbance value of 1.0 is placed adjacent to another sample chamber having absorbance value of 2.0. How much of the initial light intensity of an incident light will transmit after passing through these two sample chamber consecutively?
- [2+1.5+2+1+3+2.5]
8. a) How nanocrystals are solubilized / dispersed in a solvent?
 b) Discuss the outlines of synthesis of silver nanoparticles (Ag NPs).
 c) Write brief note on nanocomposite materials.
 d) Give one example of each type of surface ligands, namely – X-type, L-type, Z-type.
 e) What are the parts of a simple atomic absorption spectrometer (AAS) instrument?
 f) How atomization of sample is being done in an AAS instrument?
 g) A sample chamber with path-length of 2cm allows to transmit only 70% intensity of the incident light. Calculate the absorbance of the sample.
- [1.5+2+2+1.5+1.5+1.5+2]

_____ × _____