

Post Graduate Diploma in Applied Analytical Chemistry
Final Examination 2007-2008

21.04.2008

Paper - I (100 Marks)

5.00 - 8.00 p.m.

Section - I

- Note: 1) Answers to the two sections are to be written in separate answer sheet.
2) Each section carries 50 Marks.
3) Use of Log table or calculator is allowed.
4) Figures to right indicate full marks
5) All questions are compulsory

- Q.1) Write short answers for the followings (any 5): ✓ 10~
- Define Analytical Chemistry
 - What is meant by Qualitative and Quantitative analysis
 - Define sampling
 - What is meant by standardization in volumetric analysis
 - Name any four acid base indicators
 - Define solubility and solubility product
 - What is meant by validation of analytical method

- Q.2) Answer any three of the followings: 12
- Explain briefly the scope of analytical chemistry
 - Discuss the theory of indicators in detail
 - Explain basic principles of volumetric analysis
 - What is meant by systemic error and random errors? How they can be quantified?
 - Explain theory of metal ion indicator for EDTA titrations

- Q.3) Answer any two briefly. 10
- What is meant by precision and accuracy? How they are reported?

A Chemist prepared buffer solution of pH = 4.75. The replicate measurement with pH meter gave following results:

Observation No.:	1	2	3	4	5
pH:	4.73	4.78	4.74	4.76	4.77

Calculate mean, median, spread, precision in terms of average deviation, absolute and relative error in ppt with reference to second observation.

- Discuss briefly various parameters used to validate given analytical methods of analysis.
- Explain briefly the theory of precipitation titrations.
- Give detail classification of various methods of analysis based on physico chemical principles.

- Q.4) Answer any one from the following: 10
- Calculate pH of various stages of titration for titration of strong acid against strong base. Draw neat titration curve. Select suitable indicators for the same.
 - Discuss briefly why no suitable indicator is available for titration of weak acid against weak base.
 - Define polyprotic acid. Discuss briefly titration curve for titration of phosphoric acid against potassium hydroxide. Mention suitable indicators.

Q.5) Answer any two from the following:

08

- a) What is meant by standardization? What is primary and secondary standard? Give appropriate examples.
- b) Explain non-aqueous titration in brief.
- c) What are different mechanisms by which metal ions can be extracted in solvent extraction?
- d) Discuss classification of methods by :
 - i) sample size
 - ii) information sought
- e) How you will prepare following solutions:
 - i) 50 cm³ of 0.005 N H₃PO₄
 - ii) 20 cm³ of 0.003 N K₂Cr₂O₇
 - iii) 100 cm³ of 0.015 M KMnO₄
 - iv) 500 cm³ of 0.003 M H₂SO₄

Paper I
Section II

Q1. Define following terms. (Any 5)

05

- | | | | |
|------------------------|---------------------------|----------------------|----------------------|
| 1. Linearity | 2. Quality policy | 3. Preventive action | 4. Bursting strength |
| 5. Cosmetics | 6. New or novel invention | 7. Relative error | 8. Document |
| 9. Regression analysis | 10. ISO | | |

Q2. Answer in brief. (Any 5)

20

1. What is a patent? Which rights does a patent provide?
2. What is a calibration? Why it is needed for instruments?
3. What details are to be included in specifications for packaging materials?
4. What are the functions of Quality control Department?
5. Which steps are to be followed in order to achieve objectives of Quality Assurance?
6. What is Pharmacy act 1948? What is The Narcotic drugs and psycotropic substances Act?
7. Under what different conditions product degradation is conducted?
8. How will you ensure proper and representative sampling?

Q3 Write short notes on the following (Any 5)

15

1. Bar coding
2. General method for limit test for Iron.
3. Linearity study in method validation
4. Gas and liquid sampling
5. Just in Time approach (JIT)
6. Schedule M
7. The drugs and magic remedies act 1954.

Q4 Write note on the following (Any 1)

10

1. Good laboratory practices
2. Kaizen