QP Code : 78949

(2½ Hours) **[Total Marks : 75**

N.B.: 1) All questions are compulsory.
2) Figures to the right indicate full marks.
3) Use of logtables/non-programmable calculator is allowed.

1. Answer **any three** of the following: **15**

A) Give the sourcewise classification of determinate errors. Explain each class with suitable examples.

B) In replicate analysis of Ni alloy, the following results were obtained.

Sample No.	1	2	3	4	5	6
% of Ni metal	55.16	55.13	55.14	55.15	55.17	55.15

Calculate variance.

C) Explain the method of collecting representative sample of flowing liquid with a neat labelled diagram.

D) In determinatin of calcium from sample containing 400 mg of calcium by a method, following results were obtained.

Sample No.	1	2	3	4	5
Calcium found (mg)	398	403	394	396	402

Find i) absolute error ii) relative error iii) relative error in ppt.

E) Define the terms 'sample'. Explain the use of coning and quartering method in the sampling of solids.

F) Discuss the use of sample thief in the sampling of heterogeneous liquids.

2. Answer **any three** of the following? **15**

A) Discuss the nature of titration curve in the titration of weak acid versus strong base, explaining the choice of indicators.

B) Discuss the Mohr's method of determining the end point in argentimetric titrations. Explain its limitations.

C) Explain the nature of titration curve in the titration of strong acid versus strong base, justifying the suitable indicators.

D) Distinguish between spectrophotometers and colorimeters.

E) Draw a schematic diagram of single beam spectrophotometer and give the function of its components.

F) Explain the use of adsorption in indicators in precipitation titrations with suitable example.

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3. Answer **any three** of the following: 15

A) Discuss continuous extraction method for extractant heavier than water w.r.t. solvent extraction.

B) Ninety six percent of a solute is extracted from 100cm^3 of aqueous solution by extraction with two 0.05 dm^3 of organic solvent. What is the distribution ratio of solute in favour of organic solvent.

C) Discuss principle and any three applications of TLC.

D) 100 cm^3 of 0.5M aqueous solution of Fe^{2+} is to be extracted with 10cm^3 of ether. Calculate how many extractions are necessary so as to bring the concentration of Fe^{2+} in the solution to $1x10^{-5}$M. Given: $D_{o/w}$=17.6.

E) What are the advantages of TLC over paper chromatography?

F) Explain the following w.r.t. paper chromatography.
(i) Application of sample (ii) Location of separated components.

4. Answer **any three** of the following: 15

A) With the help of a neat labelled diagram, describe the construction and working of an electrothermal atomizer used in AAS.

B) Give any five application of AAS.

C) Discuss the various factors affecting fluorescence.

D) Discuss the principle of flame photometry.

E) Draw a neat labelled diagram of turbidimeter and explain its use in determining concentration of sample solution.

F) Explain: (i) turbidimetric titrations.
(ii) determination of molecular weight by turbidimetry.

5. A) Fill in the blanks. 04

a) The median of the set of values, 21.31, 21.27, 21.33 and 21.29= _____.

b) Most commonly used acid for dissolving silicate rocks is _____.

c) The most frequently occuring data from the given set of observations is called _____.

d) The sample prepared by mixing the increments is called _____ sample.

OR

A) State true or false. 04

p) Blank determination is one of the methods to minimise determinate errors.

q) Precision denotes the closeness of a measurement to its accepted value.

r) In systematic sampling, sample units are drawn, in a definite sequence at equal intervals from one another.

s) Standard deviation 's' of the percentage impurity due to sampling is given by $s = \sqrt{bp}$

5. B) Fill in the blanks. 04

a) Bromocresol green can be used as preferred indicator in the titration of weak base against _____ acid.

b) In the titration of weak acid against weak base, pH before the equivalence point can be calculated by equation,

pH = _____ + log $\frac{(Salt)}{(Acid)}$

c) In Volhard's method, _____ is used as a coagulant to prevent the reaction between thiocyanate and AgCl.

d) Calibration curve is a plot of _____ versus concentration in UV - visible spectroscopy.

OR

5. B. State true or false. 04

p) It is advisable to avoid the use of simple indicators to detect the equivalence point in weak acid-weak base titration.

q) Volhard's method for the determination of halides is a direct titration method.

r) In UV - visible spectroscopy, multiplication factor can be used to determine the concentration of the solution.

s) Unsaturated organic compounds absorb in the visible region.

5. C) Fill in the blanks. 04

a) Bush-Densen equation is given by $\frac{V_o}{V_w}$ = _____.

b) If $D_{w/o} = 0.01$ in a given solvent extraction, then $D_{o/w}$ = _____.

c) _____ values can be used to identify the components of mixture in TLC.

d) In TLC, an adsorbent coated on a glass plate acts as a _____ phase.

OR

C) State true or false. 04

p) In solvent extraction, role of solvent is to neutralise the charge of the metal ion.

q) Separation factor is the ratio of square of distribution ratios of the two solutes.
r) Paper chromatography is a type of column chromatography.
s) R_f factor for a particular solute depends on nature of mobile phase.

5. D) Fill in the blanks: 03
a) Fluorescent intensity is directly proportional to _____ of fluorescent substance.
b) The phosphoriscope measures _____ in the presence of fluorescence.
c) The role of _____ in AAS is to eliminate radiations emitted by the flame.

OR

5. D) State true or false. 03
p) Phosphorescence experiments are carried out at higher temperature.
q) Phospherescence spectrum always occurs at longer wavelength than fluorescence spectrum.
r) In flame photometry, intensity of emitted radiations remains unaffected by the presence of acid in the sample solution.

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