

Con. 1018-13.

CG-2359

(2½ Hours)

[Total Marks : 60

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

1. (a) What is relative error ? In five determinations of lead from the sample, containing 400 mg of lead, following results were obtained. 4

Sample No.	1	2	3	4	5
Lead found in mg	398	392	398	396	393

Calculate absolute error, relative error, relative error in ppt.

OR

- (a) Six samples were analyzed for its mercury content. The values obtained in ppm of mercury are as follows :- 4
 2.06, 2.16, 2.12, 1.93, 1.89 and 1.95
 Calculate mean, average deviation and standard deviation.
 Answer any **two** of the following :-
- (b) Discuss the sampling technique used for the sampling of - 4
 (i) Homogeneous liquids
 (ii) Heterogeneous liquids.
- (c) With respect to sampling of particulate solids, describe - 4
 (i) Split tube thief
 (ii) Concentric tube thief.
- (d) What are the difficulties encountered in sampling of solids ? Explain the terms bulk ratio and size to weight ratio. 4
- (e) Draw a neat labelled diagram of sample thief assembly used for sampling of gases. 4
 Explain the static method used for sampling of gases.
2. (a) Derive the expression for pH at the equivalence point in the titration of a weak acid with a weak base. 4

OR

- (a) Explain the following sentence. 4
 pH at the equivalence point in the titration of a strong acid with a strong base is 7, but if either acid or base is weak, it will not be 7.
 Answer any **two** of the following :-
- (b) Discuss the theory of adsorption indicators used in precipitation titrations. 4

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- (c) (i) In Mohr's method, titration has to be carried out in neutral or feebly alkaline solution. Explain. 2
 (ii) Explain the use of grating in spectrophotometers. 2
 (d) Distinguish between photometers and spectrophotometers. 4
 (e) (i) What is the role of an attenuator in a double beam spectrophotometer? 2
 (ii) Explain the use of a blank solution in uv-visible spectrophotometry. 2
3. (a) 250cm³ of an aqueous solution containing 100 mg of a solute was treated with 25cm³ of an organic solvent during each extraction. Calculate the minimum number of extractions required so that not more than 1 mg of the solute remains in the aqueous solution. (Given D = 10) 4

OR

- (a) 100 cm³ of an aqueous solution containing 0.1 gm of iodine is equilibrated with 75 cm³ of CCl₄. The distribution coefficient between CCl₄ and H₂O at room temperature is 85; in favour of CCl₄. Calculate the weight of iodine remaining unextracted in the aqueous phase after.
 (i) Two extractions with 75cm³ of CCl₄
 (ii) Three extractions with 25cm³ of CCl₄.
 Answer any **two** of the following :-
- (b) Explain the use of complexing agents in solvent extraction technique with suitable examples. 4
 (c) Give the classification of chromatographic methods. 4
 (d) Describe the different steps involved in the development of chromatogram in TLC. 4
 (e) What is distribution ratio ? Explain the Batch extraction method used in solvent extraction technique. 4
4. (a) Describe applications of Fluorimetry. 4

OR

- (a) Compare Fluorimetry with Spectrophotometry. 4
 Answer any **two** of the following :-
- (b) With the help of schematic diagram discuss the working of Nephelometer. 4
 (c) Describe the standard addition method for estimation of a sample solution of Flame Photometry. 4
 (d) Discuss the effect of the following on scattering of light by the solid particles in solution. 4
 (i) Concentration of solution (ii) Wavelength of radiation
 (e) With the help of Schematic diagram discuss the working of Electrothermal atomiser in A. A. S. 4

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- (a) Explain methodic errors with suitable examples. 3
 - (b) What are the various ways of minimizing determinate errors. 3
 - (c) State the expression for pH at the equivalence point in the titration of weak acid with a strong base. Suggest any two suitable indicators. 3
 - (d) Explain ! the role of the following in Volhard's method used for precipitation titrations. 3
 - (i) Potassium nitrate
 - (ii) Nitrobenzene
 - (e) Explain the development technique used in descending paper chromatography. 3
 - (f) Explain - TLC is considered to be a superior technique as compared to paper chromatography. 3
 - (g) With respect to A.A.S. Explain the role of following :- 3
 - (i) Hollow cathode lamp
 - (ii) Rotating chopper.
 - (h) What is atomic spectrum ? Explain the origin of atomic emission spectra. 3
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