

AF-115

April-2015

B.Sc., Sem.-VI

**CHE-310 : Chemistry
(Analytical Chemistry)**

Time : 3 Hours]

[Max. Marks : 70

- Instructions :**
- (1) All questions carry equal marks.
 - (2) Figure to the right indicates marks of the question.

1. (a) (1) Explain Accuracy and Precision. Give ways to expressing Accuracy and Precision. 4
- (2) Explain Determinate errors. How will you minimize the determinate errors ? 4

OR

- (1) Write a short note on: Literature of Analytical chemistry.
 - (2) A student obtained following results for the Ca^{+2} in solution.
2.70, 2.56, 2.91, 2.75, 2.72, 3.09 Can suspected result be rejected by 90% confidence level ? [$Q_{90} = 0.56$]
- (b) (1) Mention the importance of 8-Hydroxy quinoline in inorganic analysis. 3
- (2) Give structural formula of Cupferron and how will you isolate Fe^{+3} and Cu^{+2} by Cupferron reagent ? 3

OR

- (1) Mention the importance of DMG in inorganic analysis.
- (2) Give comparison of Cupferron and Neo-cupferron.

P.T.O.

2. (a) (1) Explain cation and anion exchange resin. Mention factors that affect the selectivity of ion-exchange resins. 4
- (2) Explain high performance liquid chromatography (HPLC) with its principle. 4

OR

- (1) Discuss the importance of ion-exchange equilibrium in ion-exchange Chromatography.
- (2) Discuss Van-deemter equation and explain the terms involved in the equation.
- (b) (1) Explain "For any soluble substance 100% extraction is not possible". 3
- (2) Write short note "Choice of solvent for solvent extraction". 3

OR

- (1) Using 50 ml of organic extractants each time, extraction from 100 ml aqueous solution was carried out twice and 96% of the substance was extracted, calculate the distribution ratio ?
- (2) 60 ml aqueous solution containing 0.0853 gm Iodine is shaken with 20 ml of carbon tetra chloride. If the distribution ratio is 90.6 Calculate the weight of iodine extracted ? ($I = 126.9$)

3. (a) (1) Explain following current in polarography : 4
- [i] Limiting current [iii] Catalytic current
- [ii] Diffusion current [iv] Kinetic current
- (2) Give advantages and disadvantages of ion-selective electrode. 4

OR

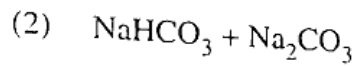
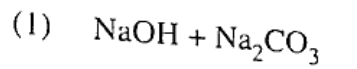
- (1) Discuss the Adverse effect of dissolved oxygen in solution in Polarographic method.
- (2) Explain Dead-stop titration.

- (b) (1) Explain : Over voltage 3
 (2) Mention advantages and disadvantages of Quin-hydrone electrode. 3

OR

- (1) Explain half wave potential ($E_{1/2}$)
 (2) Explain "Differential potentiometric titration".

4. (a) (1) By differential titration of alkalis how will you know whether given Sample of alkali contains :



- (2) Derive equation for equivalence point, when Fe^{+2} titrate with MnO_4^-

OR

- (1) Explain the titration of Polyprotic acid.

- (2) Explain "Metal as Reductors".

- (b) (1) Discuss the stepwise titrations of two Base in solution.

- (2) Discuss the use of EDTA as titrant.

OR

- (1) Write short note on- "Acid-base indicators."

- (2) Explain method of to determine hardness of water by EDTA.

5. Give answer of following in short :

- (1) What is 'F-Test' ? $F = \frac{S_1^2}{S_2^2}$ $S_1 > S_2$

- (2) What does the value of Pearson correlation coefficient, $r = 0$ suggest ?

- (3) How many significant figure in given numbers have ? (i) 0.0067 (ii) 1.2030

- (4) Why the precipitation by Cupferron always carried out in cold solution ?

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- (5) Define: Retention time (t_R)
- (6) Mention the detection range of Thermal Conductivity Detector.
- (7) What is Distribution ratio ?
- (8) Give the name of electrodes use in polarography.
- (9) State the Ilkovic equation.
- (10) Give name of various types of ion-selective electrode.
- (11) Mention the four types of potentiometric titrations.
- (12) State the 'Henderson-Hasselbalch' equation.
- (13) Mention pH range of Methyl orange indicator.
- (14) What is iodimetry titrations ?

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