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CHD 101

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B.Sc. (CBCS) (Semester - V)
EXAMINATION NOVEMBER 2022
Chemistry
Basic Topics in Analytical Chemistry

[Duration : Two Hours] **[Total Marks :60]**

Instructions :
1) All Questions are compulsory.
2) Figures to the right indicate full marks.
3) Use of non-programmable calculator is allowed.
4) Log tables will be supplied on request.

Q.1. Answer any Four of the following: **(4x3=12)**
i) Signify the importance of pH in complexometric titration.
ii) Define a) Population b) bulk ratio and c) Size to weight ratio
iii) Distinguish between Accuracy and Precision (3 points each).
iv) Explain the Batch Extraction Method.
v) Give three applications of paper chromatography.
vi) Discuss polarisable and non-polarisable electrodes in polarography.

Q.2. A) i) What is Electrogravimetry? State any 2 applications of Electrogravimetry 3
ii) Identify the appropriate number of significant figures for the following 3
a) 4587.168 b) 1.69 X 2.09 c) 6559.060

OR

iii) Discuss the general Characteristics of Coulometric Method. 3
iv) Define ion exchange capacity. How it is determined? 3

B) i) Elaborate on the importance of analytical chemistry in medical and clinical studies. 3
ii) Discuss the working of Silver Coulometer 3

Q.3. A) i) In a process of extraction of solute using the organic phase write a correct mathematical expression for the concentration of solute remained unextracted in the aqueous phase after three (3) extractions. Explain each term involved in the mathematical expression. 3
ii) Explain the principle of column chromatography. 3

OR

iii) Explain the multistage sampling and sequential sampling. 3
iv) Discuss briefly two dimensional paper chromatography. 3

B) i) Explain redox titration by giving one example. Identify oxidising and reducing agent involved in the example. 3
ii) Distribution coefficient of iodine at around room temperature between organic 3

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and aqueous phase is 84. An aqueous phase containing 0.2 g of iodine is extracted once with organic solvent. Organic solvent used is 1/3rd of the volume of aqueous phase. Calculate the weight of the solute remained unextracted in the aqueous phase.

Q.4. A) Calculate the standard deviation for the percentages of nickel in metal sample & the data is as follows 6

3.88, 3.92, 3.86, 4.01, 3.81

OR

A) Readings of the percentage of CO_2 gas in a sample is given below. Give the measurement of variance for the data as follows 6

16.26, 16.18, 16.12, 16.30, 16.23

B) Discuss in detail the following processes in gravimetric analysis: 6

a) Digestion of precipitate

b) Washing of the precipitate

Q.5. A) i) Discuss the following steps involved in analytical process 3

a) Separation of desired components

b) Actual Analysis

ii) What is the role of supporting electrolyte in polarographic analysis? 3

OR

A) iii) Sketch the neutralisation curve for the titration of 50 mL 1M HCl v/s 1M NaOH and label the equivalence point. 3

iv) Explain the determination of Cu by constant Current electrolysis 3

B) i) In a thin layer chromatographic separation the R_f value of unknown compound is found to be 0.778. The fronts due to 3 compounds A, B and C are 25, 22 and 29 cms respectively and the solvent front was 32 cms. Identify the unknown compound. 3

ii) With the help of diagram explain sampling of flowing liquids. 3

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