B.Sc. Semester-III Examination, 2022-23

CHEMISTRY [Honours]

Course ID : 31415 **Course Code : SH/CHE/305/SEC-1**

Course Title : Basic Analytical Chemistry

Time : 2 Hours Full Marks : 40

The figures in the right-hand margin indicate marks.

Candidates are required to give their answers in their own words as far as practicable.

1. Answer any **five** questions: 2×5=10

   a) Why COD is always higher than BOD for the same waste water sample?

   b) What do you mean by Nutritional value of foods?

   c) Report the value of operation (258.11+6.045+0.6832) to correct number of significant figure.

   d) Mention the role of HCl in ether extraction of iron (III) from aqueous solution.

   e) Write the names of the adulterants added in coffee powder, coriander powder, chilli powder, turmeric powder.

   f) State the major constituents of deodorants.

   g) What do you mean by chromatogram?

   h) What is retention factor (R_f) in TLC?

2. Answer any **four** questions: 5×4=20

   a) How will you separate Fe^{3+} and Al^{3+} by paper chromatography? Explain that "high precision does not always mean high accuracy".

   b) Briefly discuss the procedure of the determination of caffeine and benzoic acid in soft drinks.

   c) How do you estimate calcium and magnesium ions in soil by complexometric titration?

   d) Calculate the standard deviation and variance of the data, 24.93, 24.06, 24.89 and 24.45. Discuss the application of ion-exchange chromatography for water purification.

   e) Briefly discuss the procedure for the determination of iron in vitamin tablets by spectrophotometric method.

   f) i) Mention three important characteristics of a good ion-exchanger.

      ii) Write two important applications of thin layer chromatography.

3. Answer any **one** question: 10×1=10

a) i) How phenolphthalein is used in trap cases?

ii) How ion-exchange capacity of a resin can be determined?

iii) Distinguish between precision and accuracy.

iv) Can we separate Fe^{3+} using anion-exchange resin– Justify. 2+3+3+2=10

b) i) Discuss the process for determination of Dissolved Oxygen by Winkler method.

ii) 22.22 g of cation exchanger in the H^+ form can absorb Ca^{2+} ions fully from 1.0 L of 0.1(N) $CaCl_2$ solution. Calculate the exchange capacity of the cation exchanger.

iii) Mention two important characteristics of metal-ion indicator. 5+3+2=10

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