

U.G. 3rd Semester Examination - 2023

CHEMISTRY

[PROGRAMME]

Skill Enhancement Course (SEC)

Course Code : CHEM-G-SEC-T-1

Full Marks : 40

Time : 2 Hours

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: $2 \times 5 = 10$
- Write down the basic difference between repeatability and reproducibility.
 - Why Precision is more important than Accuracy?
 - What is masking agent in complexometric titration?
 - What are the essential criteria for selection of suitable solvents for paper chromatography?
 - What is retention factor in thin layer chromatography?

[Turn over]

- f) What are the key parameters to be measured during water sampling?
- g) Explain the key differences between deodorants and antiperspirants.

2. Answer any **two** questions: $5 \times 2 = 10$

- a) What does BOD_5 represent? A soil sample is analyzed for calcium content using both the EDTA titration method and flame photometer. Compare the advantages and disadvantages of each method. $2+3$
- b) Briefly discuss about the separation of mixture of Fe^{3+} and Al^{3+} by paper chromatography. 5
- c) What is food adulteration? Explain the various types of adulterations that can be found in food. $2+3$
- d) i) Provide examples of how a poorly designed sampling protocol can impact the validity of results. 2
- ii) The laboratory performs replicate measurements on a standard solution with a known concentration of 100 units/mL. The results of 10 replicate measurements are as follows (in units/mL): 98.4, 99.1, 100.4, 100.1, 99.9, 100.1, 99.4, 101.1, 100.2, and 99.8. Calculate (i) Mean and (ii) Standard deviation. 3

3. Answer any **two** questions: $10 \times 2 = 20$

- a) Explain the sources and roles of chloride and sulfate in deodorants. Why emulsifiers are important in cosmetics? What are the role of preservatives in cosmetics? Identify and explain three major sources responsible for contaminating water. $3+2+2+3$
- b) Name and describe two methods of food processing. What are the major drawbacks of food processing? Define alkalinity and discuss its importance in evaluating water quality. What are the essential nutrients for plant growth found in the soil? $3+2+1+2+2$
- c) Explain the significance of stationery phase and mobile phase in chromatography. How do these phases contribute to the separation of components in a mixture? What is ion exchange capacity of resins? Write down at least two commonly used indicators in complexometric titrations and explain how they function in detecting the endpoint. $3+2+2+1+2$
- d) Discuss briefly about the determination of iron in vitamin tablets by spectrophotometrically. 10