

## FOURTH SEMESTER B.Sc. DEGREE EXAMINATION, APRIL 2023

(Regular/Improvement/Supplementary)

## CHEMISTRY: COMPLEMENTARY COURSE FOR PHYSICS, BOTANY &amp; ZOOLOGY

## GCHE4C04T: PHYSICAL AND APPLIED CHEMISTRY

Time: 2 Hours

Maximum Marks: 60

SECTION A: Answer the following questions. Each carries *two* marks.

(Ceiling 20 Marks)

1. State Hardy-Schulze law.
2. What happens when an electrolyte solution is added to a lyophobic sol? Why?
3. Mention two applications of colloids in the field of medicine.
4. What is the essential difference between adsorption column chromatography and partition column chromatography?
5. Comment on the catalytic efficiency of nanomaterials as compared to their bulk forms.
6. Which would have higher % atom efficiency: a catalytic reaction or a stoichiometric reaction?
7. Comment on the mechanism by which differential migration of sample components is effected in adsorption column chromatography.
8. Under what conditions of atomic number and mass number does the spin of a nucleus become (i) half-integral, (ii) zero, and (iii) integral.
9. What are the starting materials for the preparation of Nylon 66?
10. Which are the major culprits for stratospheric ozone depletion? What are the consequences of ozone depletion?
11. How do automobiles cause air pollution?
12. Give the chemical names of (i) an antipyretic and (ii) an analgesic.

SECTION B: Answer the following questions. Each carries *five* marks.

(Ceiling 30 Marks)

13. Briefly explain (i) an optical property and (ii) a kinetic property of colloids.
14. What is green chemistry? Explain the need for green chemistry.
15. What is R<sub>f</sub> value? Explain its significance.
16. How can the NMR method be used to distinguish between the structures of propan-1-ol and propan-2-ol?

(PTO)

17. Write a note on addition and condensation polymers.
18. Discuss how DO of a water sample is measured and explain the significance of the DO value.
19. What is LPG? What are its ingredients? Mention its important uses.

**SECTION C: Answer any one question. Each carries ten marks.**

20. Discuss the significance of the concept of group frequencies in IR spectroscopy and its application in organic structural elucidation.
21. (a) Explain the term dye. Explain the requirements of a good dye.  
(b) Draw the structures of *martius yellow* and *indigo* and discuss their applications.

**(1 x 10 = 10 Marks)**