

**FOURTH SEMESTER B.Sc. DEGREE EXAMINATION, APRIL 2017**

(CUCBCSS-UG)

Complementary Course

CHE 4C 04—PHYSICAL AND APPLIED CHEMISTRY

Time : Three Hours

Maximum : 64 Marks

**Section A (One Word)***Answer all questions.**Each question carries 1 mark.*

1. The property of shrinkage of gels when allowed to stand is called \_\_\_\_\_.
2. The unit of rate constant for a second order reaction is \_\_\_\_\_.
3. The vibrational rotational spectrum is obtained in \_\_\_\_\_ region.
4. Vibrational transitions are accompanied by \_\_\_\_\_ transition.
5. The minamata episode is due to \_\_\_\_\_ metal pollution.
6. The main causative agent of global warming is \_\_\_\_\_.
7. The compound used to fix a dye to the fabric is known as \_\_\_\_\_.
8. The hardness of water is due to the presence of \_\_\_\_\_ and \_\_\_\_\_ ions in water.
9. Substances which lower the surface tension of water are called \_\_\_\_\_.
10. \_\_\_\_\_ is effective in separating and identifying small amount of substances.

(10 × 1 = 10 marks)

**Section B (Short Answers)***Answer any seven questions.**Each question carries 2 marks.*

11. What do you mean by zeta potential ? How is it developed ?
12. Colligative properties of colloidal solutions are comparatively smaller than solutions. Why ?
13. The half life period of first order reaction is 20 seconds. Calculate the time required for 99.9% completion of the reaction.
14. What are zero order reactions ? Give example.
15. What is the importance of  $R_f$  values in thin layer chromatography ?
16. Briefly explain the instrumentation of gas chromatography.
17. Distinguish thermoplastics and thermosetting plastics.
18. What do you mean by eutrophication ?

**Turn over**

19. How will you explain the production of acid rain ?
20. What are the main components of shaving soap ?

(7 × 2 = 14 marks)

### Section C (Paragraphs)

*Answer any four questions.  
Each question carries 5 marks.*

21. What are the different methods of preparation of colloids ? Explain any two.
22. Discuss the collision theory of bimolecular reaction.
23. Why thin layer chromatography is considered complementary to column chromatography ?
24. How is the information from the rotational spectral lines used in the calculation of bond length of a molecule ?
25. Write briefly on the important water quality parameters.
26. All coloured substances are not dyes. What are the essential requirements of a dye ?

(4 × 5 = 20 marks)

### Section D (Essays)

*Answer any two questions.  
Each question carries 10 marks.*

27. (a) Explain the effect of temperature on reaction rates.  
(b) How can we calculate the Arrhenius parameters ?
28. Explain the term nuclear magnetic resonance. Given an account of the use of NMR spectroscopy in obtaining structural information of simple organic compounds.
29. Explain the different classifications of polymers.
30. Describe the manufacture, composition and setting of cement.

(2 × 10 = 20 marks)