

FIFTH SEMESTER B.Sc. DEGREE EXAMINATION, NOVEMBER 2018

(CUCBCSS—UG)

Chemistry

CHE 5B 08—PHYSICAL CHEMISTRY—II

Time : Three Hours

Maximum : 80 Marks

Section A

*Answer all questions.**Each question carries 1 mark.*

1. Example of a system exhibiting Fluorescence is _____.
2. Two examples of lyophilic sols are _____.
3. Gold number of the protective colloid starch is _____.
4. Examples of substances which are efflorescent under normal conditions are _____.
5. Example of water in oil emulsion is _____.
6. Two substances which are used as adsorbent column (stationary phase) in column chromatography are _____.
7. Rf value is defined as _____.
8. Examples of two molecules possessing improper axis of symmetry are _____.
9. The symmetry elements of the molecule benzene are _____.
10. How many rotational and vibrational modes are possible for HCN ?

(10 × 1 = 10 marks)

Section B

*Answer any ten questions.**Each question carries 2 marks.*

11. What is zeta potential ?
12. What is meant by activated complex ?
13. Give a labelled phase diagram of water system.
14. Define the term Phase.
15. What is homogeneous catalysis ? Give an example.
16. Define rate of a reaction.
17. Define improper axis of rotation. Give an example.
18. Give two examples of molecules belonging to C_{2h} point group.

Turn over

19. How are wavelength, wave number, velocity and frequency related ?
20. Calculate the energy of radiation of wavelength 700 nm.
21. Sketch the different modes of vibration of CO_2 . Which of these are IR active ?
22. Give two examples for photosensitized reactions.

(10 × 2 = 20 marks)

Section C

*Answer any five questions.
Each question carries 6 marks.*

23. What is the principle of NMR spectroscopy ?
24. What are the applications of IR spectroscopy ?
25. Explain the principle of steam distillation.
26. State and explain (i) Grotthus-Draper Law ; (ii) Stark-Einstein law.
27. Discuss the transition state theory of reaction rates.
28. Give an example of simple Eutectic system and briefly discuss its salient features with the help of its phase diagram.
29. Discuss briefly Freundlich Isotherm.
30. Discuss the applications of colloidal chemistry in Industry and in medicine.

(5 × 6 = 30 marks)

Section D

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

31. (a) Discuss the principle, process and applications of Gas-liquid chromatography.
(b) Discuss the different aspects of column chromatography and its applications.
(5 + 5 = 10 marks)
32. (a) Write S.N. on Jablouski diagram.
(b) Discuss the theory of heterogeneous catalysis.
(c) Derive an integrated equation for the rate constant of a first order reaction.
(3 + 3 + 4 = 10 marks)
33. (a) Differentiate between chemisorption and physisorption.
(b) Define Group. Discuss the rules that members of a group must obey.
(5 + 5 = 10 marks)
34. (a) Construct the GMT for C_{2v} point group.
(b) Briefly discuss applications of Nernst Distribution Law.
(5 + 5 = 10 marks)

(2 × 10 = 20 marks)