D 50615 (Pages : 2) Name.....

Reg. No.....

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) Grottus-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]