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R – 1265

Reg. No. : .....

Name : .....

Sixth Semester B.Sc. Degree Examination, April 2023

First Degree Programme under CBCSS

Chemistry

Core Course X

CH 1641 : PHYSICAL CHEMISTRY II

(2017-2019 Admission)

Time : 3 Hours

Max. Marks : 80

SECTION – A

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

1. Write one example for emulsion system?
2. What is meant by thermodynamic probability?
3. What are overtones?
4. Define paramagnetic substances?
5. What is the selection rule in rotational spectroscopy?
6. Write Morse equation?
7. Write one example for lyophobic colloids?
8. Define mutual exclusion principle

P.T.O.

9. What are ensembles

10. What is condition for a molecule to show rotational spectra?

(10 × 1 = 10 Marks)

SECTION – B

Answer any **eight** questions.

11. Discuss Planck's statement on 3rd law of thermodynamics?

12. Write the expression for enthalpy in terms of partition function?

13. Explain the formation of electrical double layer

14. Explain the two scales in NMR spectroscopy?

15. Why stokes line are less intense than anti stokes lines in Raman spectroscopy?

16. Why TMS is used as standard in NMR spectroscopy?

17. Explain Freundlich adsorption isotherm?

18. Which among will not yield microwave Spectroscopy (CO. NO, HCl, and CO_2) and why?

19. What is mean by Gold number

20. Explain franck- condon principle?

21. Write note on optical exaltation?

22. What is critical micelle concentration?

(8 × 2 = 16 Marks)

SECTION – C

Answer any **six** questions.

23. Explain the determination of absolute entropy in solid, liquid and gas?

24. What are factors affecting chemical shift in NMR spectroscopy?

25. Discuss the selection rule in the case of harmonic oscillator?

26. Explain Nernst heat theorem and its application?

27. Explain the significance of lande splitting factor?

28. Explain the term stocks and anti Stokes lines in Raman spectroscopy?

29. Differentiate between physisorption from chemisorptions?

30. Briefly discuss the applications of colloids?

31. Discuss one method for the measurement of magnetic succeptibility?

(6 × 4 = 24 Marks)

SECTION – D

Answer any **two** questions.

32. (a) Describe the methods for purification of colloids?

    (b) Discuss the application of Cottrell precipitator?

    (c) How can we determine the surface area from BET isotherm?

33. (a) Solve the Schrodinger wave equation for a particle in a one dimensional box?

    (b) Give a description on various types of operators

34. (a) Explain the applications of rotational spectroscopy?

(b) Why Raman and Vibrational spectroscopy is compliment to each other?

(c) Write the principle of MRI?

35. (a) The pure rotational spectrum of gaseous HCl consist of series of equally spaced lines separated by 20.80 cm^{-1} Calculate the internuclear distance of the molecule. The atomic masses of $^{1}H = 1.673 \times 10^{-27} kg$ and $^{35}Cl = 58.06 \times 10^{-27} kg$

(b) Discuss Debye equation and Clausius-Masotti equation for molecular dipole moment?

(2 × 15 = 30 Marks)
