D 70216 (Pages : 2) Name.....

Reg. No.....

FIFTH SEMESTER B.Sc. DEGREE EXAMINATION, NOVEMBER 2019

(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 molecule belonging to C_{3v} point group is ————.
2. The number of components and variance of the following system is ————.

   Ice $\rightleftharpoons$ water $\rightleftharpoons$ water vapour.

3. The number of vibrational modes possible for SO_2 is ————.
4. Which among the carbon isotopes has a nuclear spin ?

   $^{11}_{6}C$, $^{12}_{6}C$, $^{13}_{6}C$ and $^{14}_{6}C$.

5. Give an example of Photochemical reaction.
6. Calculate the energy of an Einstein of radiation of wavelength 250 nm.
7. R_f value is defined as ————.
8. Catalyst used in Zeigler-Natta polymerisation is ————.
9. Arrhenius equation which expresses the variation of rate content of a reaction with temperature is ————.
10. An example of a molecule with centre of inversion is ————.

(10 × 1 = 10 marks)

Section B

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

11. State mutual exclusion rule. Illustrate with example.
12. Write a note on azeotropic mixtures.
13. How does temperature influence the rate of a reaction ? Explain.
14. State Stark. Einstien law and explain the term Quantum yield of a photochemical reaction.
15. Write S.N. on Thin layer chromatography.

Turn over

16. What is Dorn effect ?
17. Briefly discuss chemisorption.
18. Define proper axis and improper axis of symmetry.
19. State and explain Frank–Condon principle.
20. What is meant by (i) Finger print print region ; (ii) Chemical shift ?
21. Distinguish between adsorption and absorption.
22. Write S.N. as phosphorescence.

(10 × 2 = 20 marks)

Section C

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

23. Write S.N. on (a) Electrical double layer ; (b) Protective colloids.
24. Define group and point group. construct GMT for C2v point group.
25. Discuss theory of Homogenous and Heterogeneous catalysis.
26. Describe the collision theory of reaction rates.
27. Explain Pattinson's process of desiliverization of lead.
28. State and explain Nernst distribution law.
29. Discuss principle, process and applications of Gas chromatography.
30. What are the rules that members of a group must obey ??

(5 × 6 = 30 marks)

Section D

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

31. (a) Write S.N. as Jablonski diagram.
    (b) Optical and electrical properties of colloids.
32. (a) Write S.N. on (i) photochemical Hydrogen–Bromine reaction ; (ii) BET equation.
    (b) Draw the phase diagram of water system and discuss the application of phase rule to the system.
33. (a) Briefly discuss Langmuir and Freundlich Isotherms.
    (b) Upper CST and lower CST.
34. (a) Distinguish between Emulsions and gels.
    (b) Write S.N. as NMR spectroscopy.
    (c) Stoke's and antistoke's lines.

(4 + 4 + 2 = 10 marks)

(2 × 10 = 20 marks)