20U513S (Pages: 2) Name: ……..

Reg. No: ……..

FIFTH SEMESTER B.Sc. DEGREE EXAMINATION, NOVEMBER 2022

(CUCBCSS-UG)

CC15U CHE5 B08 - PHYSICAL CHEMISTRY - II

(Chemistry – Core Course)

(2015 to 2018 Admissions – Supplementary/Improvement)

Time: Three Hours Maximum: 80 Marks

Section A (One word)

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

1. Define the rate of a reaction.
2. Define quantum yield of of a photochemical reaction.
3. What is fluorescence?
4. Conversion of a precipitate to colloidal state is called ---------
5. Explain Tyndall effect.
6. State the phase rule and define the terms.
7. For the decomposition of $CaCO_3$, the number of components is equal to ---------
8. The principle of column chromatography is ----------
9. The basic requirement for a molecule to be micro wave active is the presence of ------
10. What is meant by zero point energy?

(10 × 1 = 10 Marks)

Section B (Short answer)

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

11. Order of a reaction need not be whole number always. Account.
12. Give one example each for (i) a parallel reaction; (ii) a consecutive reaction.
13. What is chemiluminescence? Give one example.
14. Explain Bredig's method for the preparation of gold sol.
15. What is meant by Dorn Effect?
16. Name the different symmetry elements implied by C_6 axis.
17. Discuss the principle of gel permeation chromatography.
18. What type of molecules gives rotational Raman spectra?
19. What is Frank – Condon principle?
20. Write any two advantages of Raman spectra over IR spectra.
21. Discuss the ESR spectra of hydrogen radical radical.
22. What is meant by plane of symmetry?

(10 × 2 = 20 Marks)

Section C (Paragraph)

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

23. Discuss briefly the activated complex theory of reaction rates.
24. Certain reactions have very high quantum yield whereas others have very low quantum yield.Explain.
25. Draw phase diagram of water system and explain.
26. Draw and explain the phase diagram of Pb-Ag system.
27. What is meant by chemical shift?
28. Explain how rotational spectroscopy can be used to find the bond length.
29. Draw the group multiplication table of C_{2V} point group.
30. What is meant by inverse of an operation? Explain with suitable examples.

(5 × 6 = 30 Marks)

Section D (Essay)

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

31. Discuss the theory of electronic spectroscopy.
32. Discuss collision theory of reaction rates.
33. Discuss the principle and applications of high performance liquid chromatography.
34. (a) Using Jablonski diagram explain fluorescence and phosphorescence.

    (b) Write a short note on photosensitization.

(2 × 10 = 20 Marks)

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