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F – 4022

Reg. No. : .....

Name : .....

Third Semester B.Sc. Degree Examination, January 2019
First Degree Programme Under CBCSS
Complementary Course for Botany/Microbiology
CH 1331.3 : PHYSICAL AND INORGANIC CHEMISTRY
(2013 Admission – 2016 Admission)

Time : 3 Hours

Max. Marks : 80

SECTION – A

Answer **all** questions. Answer in **one** word to maximum of **two** sentences. **Each** question carries **one** mark.

1. What is the unit of K in a zero order reaction ?
2. By what term is a substance that increases the activity of a catalyst known ?
3. Mention any two factors that influence the rate of a reaction.
4. Give Arrhenius equation.
5. What is meant by R_f value ?
6. What are stationary and mobile phase in partition column chromatography ?
7. What happens to N/P ratio when a nuclide decays by β – emission ?
8. Define binding energy.
9. How the energy of one quantum of radiation is related to its wave number ?
10. To which side (higher or lower) does shielding shift the δ value of an NMR signal ?

(10×1=10 Marks)

SECTION – B

Short answer type (**Not** to exceed **one** paragraph). Answer **any 8** questions from the following. **Each** question carries **two** marks.

11. What are auxochromes ?

12. State Frank-condon principle.

13. Explain the term shielding and deshielding with regard to NMR spectroscopy.

14. Explain stability of nucleus.

15. What is the major difference between adsorption column chromatography and partition column chromatography ?

16. Explain ideal and non-ideal solutions.

17. Define ionic product of water. What is its value at 298K ?

18. What is meant by zero order reaction ? Give examples.

19. What is the influence of temperature on reaction rates ?

20. What is the difference between order and molecularity of a reaction ?

21. The rate constant of a first order reaction is $7 \times 10^{-4}\ S^{-1}$. What is the time taken for the reactant to be reduced to one fourth of the initial concentration ?

22. The reaction $A + B \rightarrow C$ has zero order. Write its rate equation. **(8×2=16 Marks)**

SECTION – C

Short essay (**Not** to exceed **120** words). Answer **any 6** questions from the following. **Each** question carries **four** marks.

23. Explain spin-spin coupling in NMR spectroscopy.

24. Give some applications of UV spectroscopy.

25. Give a brief note on biological effects of radiation.

26. Explain ion exchange chromatography.

27. What are the important characteristics of a first order reaction ?

28. Distinguish between homogeneous and heterogeneous catalysis. Give one example for each.

29. What is the relation between degree of hydrolysis and hydrolysis constant ?

30. Briefly explain steam distillation.

31. Briefly outline the technique of thin layer chromatography. What are its advantages over paper chromatography ? **(6×4=24 Marks)**

SECTION – D

Long essay. Answer **any 2** questions from the following. **Each** question carries **fifteen** marks.

32. Discuss intermediate compound formation theory and homogeneous catalysis with suitable examples.

33. Derive an equation for pH of basic buffer.

34. State distribution law and explain its limitations.

35. a) Briefly explain the colorimetric estimation of glucose.

    b) Give principle of MRI. **(2×15=30 Marks)**