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B – 3704

Reg. No. : .....

Name : .....

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

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. Give two factors that affect the rate of a reaction.
2. What are the units of rate constants of zero and first order reactions ?
3. What is the Lowry-Bronsted concept of acids and bases ?
4. Define degree of hydrolysis.
5. Define CST of phenol-water system.
6. What is HPLC ?
7. Name the two units of radioactivity.
8. What is a chromophore ?
9. Define chemical shift.
10. State Lambert-Beer's law.

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SECTION – B

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

11. Differentiate between rate and rate constant of a reaction.
12. What are K_a and K_b ?
13. What do you mean by half life period of a reaction ?
14. Calculate H^+ ion concentration of a soft drink of pH 9.2.
15. What are the conditions that must be obeyed by an ideal solution ?
16. State distribution law.
17. Define retention time and R_f.
18. State and explain radioactive equilibrium.
19. Illustrate artificial transmutation.
20. What is the basic characteristic of electromagnetic radiation ?
21. Explain red shift and blue shift.
22. Why is TMS used as a standard in NMR spectroscopy ?

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SECTION – C

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

23. The half life period of a radioactive element is 1.4×10^{10} years. Calculate the time in which the activity of the element is reduced to 90% of its original value.
24. Derive Henderson Equation.
25. Explain nicotine-water system.

26. Explain how you would separate a mixture of aminoacids by paper chromatography.

27. How is radioactivity measured by Geiger-Muller counter ?

28. What are the different types of energies associated with a molecule ? How does rotational spectra arise ?

29. What are the different units used for measuring chemical shift ?

30. Explain Mass defect and binding energy.

31. The rate constant of a certain reaction was found to be doubled on raising the temperature from 25°C to 35° C. Calculate activation energy of the reaction.

SECTION – D

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

32. Explain the theory of homogeneous and heterogeneous catalysis.

33. Explain the different types of deviations shown by solutions from Raoult's law.

34. a) What are the applications of radioactivity in the field of agriculture and medicine ?

    b) Explain the buffer action of an acid buffer and a basic buffer. **(8+7)**

35. Explain the theory of NMR spectroscopy.

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