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Reg. No. : .....

Name : .....

Third Semester B.Sc. Degree Examination, December 2017
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. What is the relation between δ and τ scale ?
2. How many signals exhibited by the protons of TMS in its NMR spectra ?
3. Give the principle of UV spectroscopy.
4. What are the units of radioactivity ?
5. What is meant by R_f value ?
6. Define ideal solution.
7. Give two examples for immiscible liquid pairs.
8. What is the order of decomposition of H_2O_2 ?
9. What is a catalyst ?
10. Give an example for acidic buffer.

(10×1=10 Marks)

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SECTION – B

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

11. Define rate of a reaction.
12. Give Arrhenius equation and explain its significance.
13. What is meant by hydrolysis of salt ?
14. What are azeotropes ?
15. How is N/P ratio related to stability of nucleus ?
16. Define mass defect.
17. State Beer-Lambert's law.
18. Give the theory behind paper chromatography.
19. What are chromophores ?
20. Explain chemical shift.
21. What is meant by radioactive equilibrium ?
22. It is not possible to titrate a weak acid against a weak base using an indicator. Explain. **(8×2=16 Ma**

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SECTION – C

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

23. How will you interpret the PMR spectrum of ethanol ?
24. Explain the principle of NMR spectroscopy.
25. Give some applications of UV spectroscopy.
26. Explain briefly artificial transmutation.
27. Explain the detection of radioactivity by Wilson's cloud chamber method.

28. What is HPLC ? Explain its advantages.

29. Explain the effect of impurities on miscibility and CST.

30. Briefly explain Lowry-Bronstead concept of acids and bases.

31. What are the important applications of ion exchange chromatography ?

(6×4=24 Marks)

SECTION – D

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

32. a) Write a note on thin layer chromatography.

    b) Explain buffer solutions and buffer action with examples.

33. a) The masses of a proton and a neutron are 1.0078 and 1.0082 amu respectively. The atomic mass carbon is 12. Calculate the binding energy per nucleon for carbon-12.

    b) Give the applications of NMR spectroscopy.

34. a) Briefly explain collision theory.

    b) Explain how chromatographic technique used in the separation of amino acids.

35. a) Write a short note on neutron activation analysis.

    b) Explain the applications of MRI.

    c) Describe red shift and blue shift.

(2×15=30 Marl

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