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Reg. No. : .....

Name : .....

First Semester B.Sc. Degree Examination, March 2023

First Degree Programme under CBCSS

Chemistry

Complementary Course for Botany

CH 1131.3 : ANALYTICAL AND ENVIRONMENTAL CHEMISTRY

(2020 Admission Onwards)

Time : 3 Hours Max. Marks : 80

PART – A

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

1. What is lattice energy?
2. Give the electronic configuration of copper (atomic number = 29).
3. The quantum numbers n = 3 and l = 2 corresponds to which orbital?
4. What is LCAO?
5. Draw the structure of molecules with dsp^2 hybridization.
6. Give two examples for green house gases.
7. What is acid rain?
8. State Beer-Lambert law.

9. Define the term normality of a solution.

10. Mention the indicator used in iodometric titrations.

(10 × 1 = 10 Marks)

PART – B

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

11. What are orbitals? Draw the structure of d_{x2-y2} orbital.

12. State and explain Pauli's exclusion principle.

13. List any two limitations of Bohr theory of atoms.

14. Give one example each for polar covalent bond and non polar covalent bond.

15. Explain intramolecular hydrogen bonding with an example.

16. Compare the bond orders in NO and NO^+.

17. Calculate the mass of NaOH required for the preparation of 150 ml 2.5 M aqueous solution.

18. Write the chemical reactions involved in the permanganometric estimation of oxalic acid.

19. What are primary standards? Give two examples.

20. What is reverse osmosis?

21. Define BOD. What is its significance.

22. Explain the term eutrophication.

(8 × 2 = 16 Marks)

PART – C

Answer **any six** questions. Each question carries **4** marks.

23. Write Schrodinger wave equation and explain the significance of ψ and ψ^2.
24. Discuss any four postulates of Bohr atom model.
25. Explain the principle of redox indicators.
26. How will you estimate phosphate colorimetrically?
27. Write short note on electrodialysis and its application in water treatment.
28. Explain the causes and consequences of ozone depletion.
29. Compare the bond angles in water and ammonia based on VSEPR theory.
30. Discuss the classification of air pollutants.
31. Explain the Born-Haber cycle for the formation of NaCl with a neat diagram.

(6 × 4 = 24 Marks)

PART – D

Answer **any two** questions. Each question carries **15** marks.

32. Discuss the origin of hydrogen spectrum.
33. Write short notes on
    (a) Acid-base titrations. **7**
    (b) Complexometric titrations. **8**
34. (a) Define hybridization. Discuss the hybridization and structures of PCl_5 and BF_3. **8**
    (b) Write short note on hydrogen bonding and its consequences. **7**
35. Discuss the various sources of water pollution? What are the control measures for minimizing water pollution?

(2 × 15 = 30 Marks)