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Reg. No. : .....

Name : .....

First Semester B.Sc. Degree Examination, January 2024

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

SECTION – A

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

1. State Hund's rule.
2. Write Schrodinger wave equation and explain the terms.
3. Explain why H_2S is a gas where as H_2O is liquid?
4. Define bond order.
5. What is the hybridization of carbon in ethylene molecule?
6. Give two examples for primary standard substances.
7. What are iodometric titrations?
8. What is greenhouse effect?

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9. Name any two redox indicators.

10. What is the amount of DO present in pure water?

(10 × 1 = 10 Marks)

SECTION – B

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

11. What is the reason for the stability of configuration with completely filled and half-filled orbitals?

12. State and explain Pauli's exclusion principle.

13. How many orbitals are possible for an energy level $n = 4$?

14. Predict the geometry of ammonia molecule based on VSEPR theory.

15. Explain intramolecular hydrogen bonding with an example.

16. Which is more stable O_2 or O_2^{2+} ? Justify.

17. Explain why HCl is not used in permanganometric titrations.

18. 350 ml of 0.2 N NaOH solution required 220 ml of HCl solution. What is the normality of HCl solution?

19. What are complexometric titrations? Give one example.

20. What are the causes of ozone layer depletion?

21. Mention any four major air pollutants.

22. Explain the term biomagnification.

(8 × 2 = 16 Marks)

SECTION – C

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

23. What are quantum numbers? Discuss the significance of different quantum numbers.

24. Discuss the different series of hydrogen spectrum.

25. Explain the theory of an indicator in acid-base titrations.

26. Explain the principle of permanganometric titrations.

27. What is hybridization? Explain sp^3d^2 hybridization with an example.

28. State and explain Fajan's rules.

29. Differentiate between BOD and COD.

30. Write short note on various sources of water pollution.

31. Mention any four limitations of VSEPR theory.

(6 × 4 = 24 Marks)

SECTION – D

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

32. Discuss the postulates of Bohr Theory. Discuss its merits and demerits. Derive Bohr energy equation.

33. Explain the principle of colorimetry. Describe steps involved in the colorimetric estimation of iron.

34. Explain Born-Haber cycle. How it is useful for the calculation of lattice energy?

35. Write an essay on various methods for the treatment of industrial waste water.

(2 × 15 = 30 Marks)