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Reg. No. : .....

Name : .....

First Semester B.Sc. Degree Examination, June 2022

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 (Maximum **two** sentences. **Each** question carries 1 mark)

1. Write down Schrodinger wave equation?
2. What is the hybridisation and shape of SF_6 molecule?
3. Write any two major environmental issues.
4. Name any two sources of dissolved oxygen.
5. What do you mean by synthetic resin?
6. Write Schrodinger wave equation?
7. Give two examples for primary standard.
8. Give an example for an indicator which is used in strong acid vs weakbase titrations.

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9. Define normality.

10. What do you mean by neutralisation point in titration?

(10 × 1 = 10 Marks)

SECTION – B

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

11. Write the electronic configuration of Copper (At. No = 29)

12. Explain Aufbau rule.

13. Name the five series in Hydrogen spectrum.

14. Give examples for the compounds having dsp^2 and dsp^3 hybridization. Draw structure also.

15. Why bond angle for water is reduced from actual tetrahedral angle?

16. What is bond order?

17. What is reverse osmosis?

18. What is BOD?

19. Write any two factors affecting the purity of water.

20. How activated charcoal is used for the treatment of industrial water?

21. Explain Greenhouse effect.

22. Write the procedure to prepare a standard solution.

23. Explain dichrometric titrations.

24. Calculate the molarity of the solution obtained by dissolving 10 g of NaOH in 100 ml water.

25. State Beer-Lamberts law.

26. Explain the principle behind the colorimetric estimation of phosphate.

(8 × 2 = 16 Marks)

SECTION – C

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

27. Draw the structure of five d-orbitals. How many electrons can be accommodated in d orbitals?

28. Explain (a) Hund's rule of maximum multiplicity and (b) Pauli's exclusion principle.

29. Explain Born-Haber cycle with an example.

30. Explain how the partial covalent character of the ionic bond can be determined?

31. Describe the causes for ozone layer depletion.

32. Discuss the role of chemistry in environmental protection.

33. Explain procedure involved in Winkler's test.

34. Explain the procedure involved in the calculation of COD.

35. Explain the theory of acid base titrations.

36. Discuss the procedure involved in the estimation of Iron.

37. Explain complexometric titration of Zinc with EDTA.

38. Discuss the theory of redox indicators.

(6 × 4 = 24 Marks)

SECTION – D

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

39. What are quantum numbers? Explain its significance.

40. Explain the postulates of Bohr theory. Using Bohr's postulates derive the expression for the frequency of radiation.

41. Calculate the bond order of O_2, O_2^{2+} and O_2^{2-}. Arrange them in the increasing order of their bond distance and stability. Explain.

42. What is Hydrogen bond? Explain the differences between Inter and intramolecular hydrogen bonding with examples. How the volatility and solubility of compounds is related with hydrogen bonding?

43. Explain in detail about Water pollution.

44. (a) Explain various postulates of VSEPR theory, also its limitations.

(b) Discuss on permanganometric titrations using suitable example.

(2 × 15 = 30 Marks)
