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Reg. No. : .....

Name : .....

**First Semester B.Sc. Degree Examination, August 2021**

**First Degree Programme under CBCSS**

**Chemistry**

**Complementary Course I for Botany/Zoology/Microbiology**

**CH 1131.3/CH 1131.4/CH 1131.7 – THEORETICAL CHEMISTRY**

**(2017-2019 Admission)**

Time : 3 Hours

Max. Marks : 80

**SECTION – A**

Very short answer type

Answer **all** questions

Answer in one word to maximum of two sentences ,

Each question carries 1 mark.

1. What is the geometry of  $\text{ClF}_3$  molecule?
2. Calculate bond order in NO using molecular orbital theory.
3. Explain the significance of Spin quantum number.
4. Give the electronic configuration of Chromium (atomic number 24).
5. Define Normality.

P.T.O.

6. State Beer-Lamberts law.
7. Name one primary standard used in titrations.
8. Write down the Schrodinger equation.
9. Give one example for redox indicator.
10. What is Lattice Energy?

(10 × 1 = 10 Marks)

#### SECTION – B

Short answer type

Answer **any eight** questions from the followings

Each question carries **2** marks.

11. What is meant by DO and give the desired value for pure water?
12. What is the principle of indicators used in acid base titrations?
13. Predict the structure and hybridization in  $\text{XeF}_6$ .
14. Comment on stability of  $\text{O}_2$  and  $\text{O}_2^+$ .
15. What are metallochromic indicator?
16. Explain Hunds rule.
17. What is meant by redox titrations?
18. Comment on the boiling points of o-nitro phenol and p-nitro phenol?

19. Which are greenhouse gases? Mention their sources.
20. Explain agricultural pollution.
21. How does CFC's Deplete ozone?
22. Define hybridization? Mention the type of hybridization in  $\text{PCl}_5$ .

**(8 × 2 = 16 Marks)**

### SECTION – C

#### Short essay

Answer **any six** questions from the following

Each question carries **4** marks.

23. Explain Born Haber cycle.
24. Explain Quinonoid theory of acid-base indicators.
25. Write Fajan's rules.
26. What are the postulates of VSEPR theory?
27. Explain the terms: BOD and COD.
28. What is meant by Eutrophication and how it affects water quality?
29. Explain the method of Reverse osmosis.
30. Discuss the importance of ozone layer.
31. Explain Pauli's principle.

**(6 × 4 = 24 Marks)**



## SECTION – D

### Long essay

Answer **any two** questions from the following.

Each question carries **15** marks.

32. Briefly explain water pollution and its different sources. 15
33. Explain the principle of :
- (a) Permanganometric titrations
  - (b) Dichrometric titrations
  - (c) Complexometric titrations. 15
34. (a) Discuss Bohr Theory, highlighting its merits and demerits.
- (b) Write a note on quantum numbers? Give its significance. 15
35. (a) Write a note on hydrogen bonding in molecules. Explain how it affects molecular properties.
- (b) Explain geometry and bond angles in water, and ammonia in the light of VSEPR theory. 15

(2 × 15 = 30 Marks)