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Reg. No. : .....

Name : .....

First Semester B.Sc. Degree Examination, January 2024

First Degree Programme under CBCSS

Chemistry

Complementary Course for Physics and Geology

CH 1131.1/CH 1131.2 : THEORETICAL CHEMISTRY

(2017-2019 Admission)

Time : 3 Hours Max. Marks : 80

SECTION – A

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

1. Write the electronic configuration of Copper.
2. Write down the time-independent Schrodinger wave equation.
3. What is the bond order of O_2^{2-}?
4. What is the geometry and hybridization of XeF_4 molecule?
5. What is the dipole moment of BF_3?
6. Suggest a radio-isotope used for the treatment of thyroid disorder.
7. Define the term half-life period.

P.T.O.

8. Among $K_2Cr_2O_7$ and $KMnO_4$, which can be used as a primary standard?

9. Give an example of a redox indicator.

10. Precipitation of cations in qualitative analysis is based on which parameter?

(10 × 1 = 10 Marks)

SECTION – B

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

11. State Hund's rule.

12. Write down the Rydberg equation.

13. What are the significances of Pauli's exclusion principle?

14. What is binding energy and how is it calculated?

15. What are the factors affecting the lattice energy?

16. What is Fricke dosimeter?

17. Give a brief account of neutron-proton ratio.

18. What is Wilson cloud chamber?

19. Give two advantages of complexometric titrations.

20. What is the difference between end point and equivalent point?

21. The solubility of AgCl in water is 0.00179 g/L. Calculate the solubility product of AgCl.

22. A solution is prepared by dissolving 2g NaOH in distilled water to give 250 mL solution. Calculate the molarity of the solution.

(8 × 2 = 16 Marks)

SECTION – C

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

23. Water exists as liquid at room temperature while H_2S is a gas at the same temperature. Explain.

24. Write a note on Fajan's rule.

25. Describe how hydrogen bonding affects the boiling points of compounds.

26. Distinguish between orbit and orbital.

27. Discuss the Born-Haber cycle considering the formation of NaCl.

28. Write a note on the biological effects of radiation.

29. A freshly cut piece of wood gives 16100 counts of β-ray emission per minute per kg and an old wooden bowl gives 13200 counts per minute per kg. calculate the age of the wooden bowl. The half-life period of ^{14}C is 5568 years.

30. What are the principles of redox titration?

31. What is the difference between primary standard and secondary standard solutions?

(6 × 4 = 24 Marks)

SECTION – D

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

32. Explain the various types of chemical bonds.

33. Discuss the different approaches of electronegativity.

34. Explain the principle and applications of thin-layer chromatography and paper chromatography.

35. Describe the theory of acid-base indicators.

(2 × 15 = 30 Marks)
