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Reg. No. : .....

Name : .....

First Semester B.Sc. Degree Examination, March 2023

First Degree Programme Under CBCSS

Chemistry

Complementary Course for Physics & 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. The size of the atom is described by which quantum number?

2. State Aufbau rule.

3. Suggest the name of the principle which says that every additional electron enters the orbital with the lowest possible energy.

4. Give the shape of the dsp^2 hybrid orbital.

5. What is the dipole moment of CCl_4?

6. Give any two factors that determine ionic compounds' lattice energy.

7. If n/p ratio is high, the nucleus tends to stabilize it by which process?

P.T.O.

8. Give the units of radioactivity.

9. In cation analysis, third-group metals are precipitated in which chemical form?

10. What is the principle of paper chromatography.

(10 × 1 = 10 Marks)

SECTION – B

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

11. What is the Rydberg equation?

12. What is the physical significance of Schrodinger wave function?

13. How does the stability of the half-filled orbitals differ from that of fully-filled orbitals?

14. The bond angle in NH_3 is different from the bond angle of the tetrahedral bond angle. Why?

15. Distinguish between intermolecular and intramolecular hydrogen bonding.

16. What is the Born-Haber cycle?

17. How mass defect is related to binding energy?

18. What is radiocarbon dating?

19. What is Geiger Muller scintillation counter?

20. What are the advantages of oxidation-reduction titrations.

21. What is the difference between molarity and molality?

22. The K_{sp} of $PbBr_2$ is 4×10^{-6} at 300K. Find out the solubility of $PbBr_2$ at this temperature.

(8 × 2 = 16 Marks)

SECTION – C

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

23. Write the postulates of Bohr model of atom.

24. Explain hydrogen spectrum.

25. What is meant by VSEPR theory? What are the limitations?

26. Explain the dsp^3 hybridization.

27. Explain how artificial transmutation takes place with suitable examples.

28. Explain the working of a scintillation counter.

29. Discuss Mullikan's approach to the electronegativity scale.

30. Briefly discuss the energetics of ionic bond formation.

31. What is common ion effect? What are its applications?

(6 × 4 = 24 Marks)

SECTION – D

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

32. Explain the various steps involved in deriving spectral frequency from the Bohr equation.

33. (a) What are quantum numbers? Discuss.

    (b) Draw and explain the MO diagram for the O_2 molecule.

34. Write a note on

    (a) Rock dating

    (b) Neutron activation analysis

35. How will you analyze a compound qualitatively?

(2 × 15 = 30 Marks)
