22U213S (Pages: 2) Name: ……..

Reg. No: ……..……

SECOND SEMESTER B.Sc. DEGREE EXAMINATION, APRIL 2023

(CUCBCSS-UG)

CC15U CHE2 B02 – THEORETICAL AND INORGANIC CHEMISTRY – II

(Chemistry – Core Course)

(2015 to 2018 Admissions – Supplementary/Improvement)

Time: Three Hours Maximum: 80 Marks

Section A

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

1. The electronic configuration of Be atom is _____
2. A 2s orbital has _____ radial nodes
3. The number of unpaired electrons in Mn^{2+} is
4. The shape of BF_3 molecule is _____
5. The dipole moment of CH_4 molecule is _____
6. The bond order of He_2 molecule is _____
7. Ice has a _____ density than water.
8. The most electropositive element is _____
9. The radius of Cl is ……. than that of Cl^-
10. Li shows diagonal relationship with _____

(10 × 1 = 10 Marks)

Section B

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

11. What is Born-Oppeneheimer approximation?
12. Explain bond order with an example.
13. State and explain Aufbau principle.
14. Explain the term Hermitian operator.
15. Write and explain Born-Lande equation.
16. Explain Fajan's rule with appropriate examples.
17. What is the shape of $SnCl_2$ molecule?
18. How do van der Waals forces depend on temperature?
19. Why does NH_3 have a higher dipole moment than NF_3 though both are pyramidal?
20. Explain the term electron affinity.
21. Write a note on effective nuclear charge.
22. What is a covalent bond?

(10 × 2 = 20 Marks)

Section C

Answer any ***five*** questions. Each question carries 6 marks.

23. Sketch the shape of different d-orbitals.
24. Explain the significance of the square of wave function Ψ^2.
25. Discuss the merits of the long form of periodic table.
26. Give the main features of VSEPR Theory.
27. Explain the factors that influence the formation of an Ionic bond.
28. How does the concept of hybridization explain the geometry of SF_4 ?
29. Explain how M. O. theory accounts for Para magnetism of O_2.
30. Discuss the M.O. diagram of CO.

(5 × 6 = 30 Marks)

Section D

Answer any ***two*** questions. Each question carries 10 marks.

31. Compare VB and MO theories of chemical bonding.
32. What are quantum numbers? Discuss the significance of each quantum number.
33. Derive the time independent Schrodinger wave equation for particle in a one dimensional box.
34. (a) Explain various factors influencing ionization energy and electron affinity of elements in the periodic table.
    (b) Write a note on dipole-induced dipole and induced dipole-induced dipole interactions.

(2 × 10 = 20 Marks)

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