23U214S (Pages: 2) Name: ……..

Reg. No……

SECOND SEMESTER B.Sc. DEGREE EXAMINATION, APRIL 2024

(CUCBCSS-UG)

CC15U CHE2 B02 - THEORETICAL AND INORGANIC CHEMISTRY – II

(Chemistry - Core Course)

(2016 to 2018 Admissions – Supplementary)

Time: Three Hours Maximum: 80 Marks

Section A

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

1. The electronic configuration of He atom is …….
2. A 1s orbital has ……. radial nodes
3. The number of unpaired electrons in Fe^{3+} is
4. The shape of BeF_2 molecule is …….
5. The dipole moment of CCl_4 molecule is …….
6. The bond order of Ne_2 molecule is …….
7. Ice has a ……. density than water.
8. The most electronegative element is …….
9. The radius of Na is ……. than that of Na^+
10. Be shows diagonal relationship with …….

(10 × 1 = 10 Marks)

Section B

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

11. What are operators? Explain.
12. Define the term orbital.
13. State and explain Pauli exclusion principle.
14. Explain the term Hermitian operator.
15. Define lattice energy.
16. What is meant by hybridization?
17. What is the shape of IF_7 molecule?
18. How do van der Waals forces depend on temperature.
19. What are dipole-dipole forces?
20. Explain the term electron affinity.
21. Explain why the first ionization enthalpy of B is less than that of Be.
22. What is a coordinate bond?

(10 × 2 = 20 Marks)

Section C

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

23. What are Laplacian and Hamiltonian operators? Explain.
24. Explain the significance of the wave function Ψ.
25. Discuss the merits of the long form of periodic table.
26. Explain the terms screening effect and effective nuclear charge.
27. What are the different types of hybridizations involving d orbitals?
28. How does the concept of hybridization explain the geometry of acetylene?
29. Explain how M.O. theory accounts for Para magnetism of O_2.
30. Discuss the M.O. diagram of NO.

(5 × 6 = 30 Marks)

Section D

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

31. State and explain postulates of quantum mechanics.
32. What are quantum numbers? Discuss the significance of each quantum number.
33. Discuss Molecular orbital theory by taking suitable examples.
34. What is Born-Haber cycle? Discuss with respect to NaCl.

(2 × 10 = 20 Marks)

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