



24019192

QP CODE: 24019192

Reg No : .....

Name : .....

**B.Sc DEGREE (CBCS) REGULAR / IMPROVEMENT / REAPPEARANCE  
EXAMINATIONS, MAY 2024**

**Second Semester**

**Core Course - CH2CRT02 - THEORETICAL AND INORGANIC CHEMISTRY**

(Common for B.Sc Chemistry Model I ,B.Sc Chemistry Model II Industrial Chemistry ,B.Sc Chemistry Model III Petrochemicals)

2017 ADMISSION ONWARDS

1A26FC2B

Time: 3 Hours

Max. Marks : 60

**Part A**

*Answer any **ten** questions.*

*Each question carries **1** mark.*

1. Explain why atoms are electrically neutral.
2. Calculate the energy of the electron in the ground state of **He<sup>+</sup>** ion.
3. Distinguish between polarisation and polarisability.
4. Why H-O-H bond angle in water molecule is comparatively higher than H-S-H bond angle in H<sub>2</sub>S molecule?
5. Draw the resonance structures of carbonate ion.
6. Give the hybridisation and geometry of PCl<sub>3</sub> molecule.
7. Compare the bond order and stability of N<sub>2</sub>, N<sub>2</sub><sup>+</sup> and N<sub>2</sub><sup>2+</sup>
8. Why ortho substituted organic compounds have lower melting or boiling points than para substituted compounds?
9. What is Debye force?
10. Why the ionization energy of Zinc is high as compared to other elements in the row?
11. Why **Rh-Ir** and **Pd-Pt** exhibit almost similar size?
12. What is Mischmetal?





(10×1=10)

**Part B**

Answer any **six** questions.

Each question carries **5** marks.

13. Explain Black body radiation with its spectrum.
14. Explain the Zeeman effect.
15. Define lattice energy. What are the factors affecting lattice energy?
16. Comment on the relationship between dipole moment of molecules and molecular structure.
17. Compare Bonding molecular orbitals and Antibonding molecular orbitals.
18. What is meant by metallic bond? What are the characteristics of metals? Explain the free electron theory of metals.
19. Why does the first ionization enthalpy increases as we go from left to right through a given period of periodic table?
20. Describe the oxidizing character of **KMnO<sub>4</sub>** in acidic and basic medium.
21. Why are **La<sup>3+</sup>**, **Ce<sup>3+</sup>**, **Yb<sup>3+</sup>** and **Lu<sup>3+</sup>** are colourless ions?

(6×5=30)

**Part C**

Answer any **two** questions.

Each question carries **10** marks.

22. a) Why do fully filled and half-filled orbitals have extra energy explain with example b) Explain Aufbau principle and explain the relative energies of different subshells using Bohr-Bury's rule in multi electron atoms.
23. (a) Write the postulates of VSEPR theory. (b) On the basis of VSEPR theory, explain the geometry of **ClF<sub>3</sub>**, **IF<sub>5</sub>** and **IF<sub>7</sub>**.
24. Draw the MO energy level diagram of **CO** and **NO** molecules. Calculate the bond order and explain their magnetic properties.
25. Give a brief description on the occurrence and the extraction of lanthanides.

(2×10=20)

