

- c) Out of O and F, which is more electronegative element and why? (5,5,2.5)
7. a) What is inert pair effect? How does it vary down the group? Give reason with suitable examples.
- b) Describe the significance of all quantum numbers.
- c) Calculate momentum of particle which has de Broglie's wavelength of 2.6×10^{-10} m. ($h = 6.6 \times 10^{-34}$ Kg m² s⁻¹). (5,5,2.5)
8. a) Explain the multicentre bonding with respect to diborane.
- b) Explain hydrometallurgy.
- c) Why first member of each group shows anomalous behavior? Explain. (5,5,2.5)

(200)

[This question paper contains 4 printed pages.]

Your Roll No.....

आपका अनुक्रमांक.....

Sr. No. of Question Paper : 6291

I

Unique Paper Code : 42171111

Name of the Paper : DSC: Inorganic Chemistry

Name of the Course : B.Sc. Prog.

Semester : I

Duration : 3 Hours

Maximum Marks : 75

Instructions for Candidates

1. Write your Roll No. on the top immediately on receipt of this question paper.
2. All questions carry equal marks.
3. Attempt any six questions in all.

1. a) Define solvation energy. Which has more size in aqueous solution Li⁺ or K⁺ ion? Justify.

b) Explain why

i. 's' orbitals are spherically symmetrical.

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ii. Dipole moment of BeCl_2 is zero whereas that of H_2S is not.

c) Write electronic configurations of Mn and Cu.

(5,5,2.5)

2. a) What is Lanthanide Contraction? What are its causes? Give its any two consequences.

b) Explain why:

i. The sulphide ores are firstly converted to oxides before reduction by carbon?

ii. 1p and 2d orbitals are not possible.

c) Using LCAO method, draw the shapes of p-p combination of atomic orbitals, both axial and sideways. (5,5,2.5)

3. a) Draw molecular orbital diagram of O_2 . Find out its bond order and comment on its magnetic nature.

b) Explain why:

i. Cu(II) salts are coloured but Zn(II) salts are colourless.

ii. Cations are smaller and anions are larger in radii than their parent atoms?

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c) Draw shapes of dz^2 and p_x orbitals. (5,5,2.5)

4. a) What is diagonal relationship. Give any two similarities between Li and Mg.

b) Draw an Ellingham Diagram for metal oxides and explain why most of the lines slope upwards from left to right and why the lines change in slope?

c) Is it possible to reduce TiO_2 with carbon?(5,5,2.5)

5. a) Draw and explain molecular orbital diagram of CO.

b) Write short note on hydrides of nitrogen.

c) Explain why large number of transition metal complexes are coloured? (5,5,2.5)

6. a) Write down the shape and hybridization of SO_4^{2-} and BCl_3 .

b) Explain why:

i. Half filled and fully filled orbitals are associated with extra stability.

ii. Cerium(III) ion is colourless while cerium(IV) is red.

P.T.O.