

B.Sc 4th Semester Home Assignment

Subject: Chemistry (Major)

Paper: Inorganic Chemistry I

Last date of submission: 07/08/2020

Total Marks: 50

Q1. Answer the following questions

1x5= 5

- CO₂ is a gas but SiO₂ is a highly stable solid. Why?
- Draw the structure of Diborane.
- What is meant by “isoelectronic ions”?
- Why second ionization energy of sodium is very high as compared to its first ionization energy.
- Boron trichloride is monomeric while aluminium trichloride is dimeric. Why?

Q2. Answer the following questions

3x5=15

- Discuss electronegativity according to Mulliken’s approach
- Explain why-
 - AgI₂⁻ complex is stable but AgF₂⁻ is not.
 - [Co(NH₃)₅F]²⁺ is stable while [Co(NH₃)₅I]²⁺ is unstable
 - HF is a strong acid in liquid ammonia but is a weak acid in water.
- Construct the Latimer diagram for manganese in basic solution and predict which oxidation state will be stable.
- Construct the Frost diagram for oxygen in acid solution from Latimer diagram
0.695V 1.736V
O₂ → H₂O₂ → H₂O
- What is polarization of molecules and ions. Discuss Fajan’s rules regarding polarization.

Q3. Predict the structure and magnetic behaviour of [NiX₄]²⁻ (X=Cl, CN) complexes on the basis of Valence Bond Theory. **5**

Q4. What are meant by the terms labile and inert complexes? Explain on the basis of crystal field theory, the cause of lability and inertness of octahedral complexes. **5+5=10**

Q5. Explain briefly geometrical isomerism. Draw the structures of various geometrical isomers of the following complexes **5**

- [PtCl₂(NH₃)₂]
- [Pt(NO₂)(C₅H₅N)(NH₃)(NH₂OH)]

Q6. Define electron affinity. Explain the general trends of electron affinity in periodic table. Electron affinities of beryllium, magnesium, calcium and nitrogen are practically close to zero. Explain **1+2+3=6**

Q7. Discuss Slater’s rule. Calculate the effective nuclear charge for the last electron in sodium atom. **2+2=4**