

B.Sc 4th Semester Home Assignment

Subject: Chemistry (Major)

Paper: Inorganic Chemistry II

Last date of submission: 07/08/2020

Total Marks: 50

Q1. Answer the following questions **1x5=5**

- a) What is 18 electron rule ?
- b) Fe^{2+} is more easily oxidized to Fe^{3+} while Mn^{2+} to Mn^{3+} is not. Why?
- c) Arrange the following in accordance with their pK_a values
 H_3PO_4 , H_3PO_3 , H_3PO_2
- d) What are inner sphere and outer sphere complexes?
- e) What are the applications of silicones?

Q2. Answer the following questions **3x5=15**

- a) In going from left to right of the 1st transition series for bivalent ions, the Lewis acidity steadily increases. Justify your answer.
- b) B_2O_3 is acidic whereas Al_2O_3 is amphoteric. Why?
- c) Write the product of the reaction between lithium hydride and carbon dioxide. Whether LiH is electrovalent or covalent compound. Explain
- d) Explain why
 - i) The most common oxidation state of Cu is +2 but that of Ag is +1
 - ii) Gold forms Au^- ion under suitable conditions but Cu or Ag does not.
- e) Give one example of each of (i) orthosilicate (ii) pyrosilicate (iii) cyclic silicate and draw their structures.

Q3. Define CFSE in tetrahedral and octahedral ligand field environments. Calculate CFSE for

- i) d^5 system in weak and strong ligand fields
- ii) d^5 system in tetrahedral environments. 2+2+2=6

Q4. Draw the structure of Borazine. With the help of its reaction with HCl, explain why chemical properties of borazine are quite different from those of benzene. 2+3=5

Q5. State the method of preparation of diborane from BF_3 . What happens when diborane is react with (i) water (ii) excess ammonia at low temperature. 2+3=5

Q6. Using IUPAC nomenclature state the formula of- 4

- i) Tetrakis(trifluorophosphine) nickel (0)
- ii) Diamidotetraamminecobalt (III) bromide
- iii) Ammonium trioxalatocobaltate(III)
- iv) Hexamine chromium(III) hexafluorocobaltate(III)

Q7. Explain the structures of different types of silicates 5

Q8. Discuss the bonding of CO in metal carbonyls. Find EAN of metal atoms in $\text{Ni}(\text{CO})_4$ and $\text{Fe}(\text{CO})_5$. Also give their structures. 2+2+1=5

