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B.M.S. COLLEGE FOR WOMEN AUTONOMOUS
BENGALURU-560004
SEMESTER END EXAMINATION-APRIL/MAY- 2023

M.Sc. in Chemistry-I Semester
Inorganic Chemistry-I

Course code: MCH101T

Time: 3 hrs

QP Code: 11007

Max.Marks:70

Instructions: Answer Question No.1 and any **FIVE** of the remaining.

1. Answer any **TEN** questions (2×10 =20)
- a) State Bent's Rule with an example.
 - b) Mention the features of agostic bond.
 - c) What are Zintl ions? Explain with an example.
 - d) Draw the topological structure of B_5H_{11} and find its *styx* code.
 - e) What is faujasite? Mention one use of it.
 - f) Why borazine is known as inorganic benzene?
 - g) Mention two applications of isopoly and heteropoly acids.
 - h) Differentiate between LNCC and HNCC compounds with suitable examples.
 - i) Define the term symbiosis.
 - j) Differentiate secular and transient equilibria.
 - k) What is Auger effect?
 - l) How nanomaterials can be synthesized by sol gel method.
2. a) State Fajan's Rules. Discuss its applications.
b) Derive Born Lande Equation.
c) Describe the relationship between electronegativity and partial ionic character. (3+4+3=10)
3. a) Discuss the classification of silicates with examples
b) Write a short note on Phosphazenes (5+5=10)

4. a) Mention two applications and limitations of HSAB concept.
b) Write the structure of $[\text{Re}_2\text{Cl}_8]^{2-}$. Based on MO theory comment on its bond order.
c) Discuss the acid base reactions in BrF_3 as a solvent. **(3+4+3=10)**
5. a) Mention the salient features of Liquid Drop Model.
b) Discuss any two methods of synthesis of nanomaterials. **(5+5=10)**
6. a) What are radius ratio rules? Derive the limiting radius ratio for an octahedral site of a crystal lattice.
b) Write a short note on Sulphur-Nitrogen compounds. **(5+5=10)**
7. a) Draw the MO diagram of CO molecule. Discuss its salient features.
b) Calculate the percentage of ionic character in Na-Cl bond in NaCl molecule. Predict the nature of NaCl molecule. $\chi_{\text{Na}} = 0.9$, $\chi_{\text{Cl}} = 3.0$ **(6+4=10)**
8. a) ^{227}Ac has a half-life of 22.0 years with respect to radioactive decay. The decay follows two parallel paths, one leading to ^{227}Th and the other ^{223}Fr . The percentage yields of these two daughter nuclides are 2.0 and 98 respectively. What are the decay constants of each of the separate paths?
b) Discuss any two applications of nanomaterials.
c) Write Wades-Mingos and Lauher rules. Using these rule predict the structures of $\text{Os}_5\text{C}(\text{CO})_{15}$ and $\text{Rh}_6(\text{CO})_{16}$ **(4+3+3=10)**