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B.M.S. COLLEGE FOR WOMEN
BENGALURU -560004

I SEMESTER END EXAMINATION – APRIL - 2024

M.Sc. CHEMISTRY-INORGANIC CHEMISTRY-I
(CBCS Scheme – F+R)

Course Code: MCH101T **QP Code: 11007**
Duration: **3 Hours** **Max. Marks: 70**

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

1. Answer any *TEN* questions **(2×10 =20)**

a) What are zintil ions? Give examples.

b) Mention the consequences of synergic and agostic bonding.

c) Define the term apicophylicity.

d) Borazine is called inorganic benzene. Justify

e) Write the structure of amphiboles? Give two examples.

f) How is polythiazyl synthesized? Mention its important properties.

g) Depict the structure of metal clusters $Rh_6(CO)_{16}$ and $[Fe_4C(CO)_{12}]^{2-}$

h) Give the applications of heteropoly acids.

i) Write the equation for self-ionization of liq.N_2O_4. Justify the ionization with any one reaction.

j) Differentiate mass defect and binding energy.

k) What are the advantages of sol-gel process?

l) Distinguish between β^- and β^+ decay. Give one example in each case.

2. a) Give the postulates of VSEPR theory. Based on it, explain the structures of TeF_5^-,ICl_4^- and XeF_8^{2-}.What are the limitations of this theory.

b) Draw the structure of ionic solid $CaTiO_3$ and explain its features. **(5+5=10)**

3. a) Explain structure and bonding in cyclophosphazene. Write any two reactions of it.

b) Discuss briefly on molecular sieving and ion exchange properties of zeolites. **(5+5=10)**

4. a) What is HSAB principle? Discuss its applications with suitable example.

b) Write in detail reactions involved in the preparation of isopolytungstates. **(5+5=10)**

5. a) Brief out any two methods to synthesis nanoparticles. Mention its important properties.

b) Discuss the salient features of liquid drop model of a nucleus. **(5+5=10)**

6. a) List out the postulates of Fajan's rule. Explain how these rules helps in predicting the partial covalency in ionic bond.

b) What are radius ratio rule? Show that the limiting radius ratio for octahedral site in 0.414.

c) Draw the topological structure of B_2H_6. Find its STYX code. **(4+3+3=10)**

7. a) Give the empherical formula of cyclic silicates. How are they classified? Give an example for each type.

b) Write a note on symbiotic effect

c) What are carboranes? Give their classification with an example for each. **(4+3+3=10)**

8. a) Calculate the decay constant, mean life time and half-life of a radionuclide, when activity diminished by 10% in 100 days.

b) Write the evidences for shell model of the nucleus? Based on this model, predict the nuclear spin and parity of ^{7}Li and ^{17}O.

c) Sketch the molecular orbital energy level diagram of CO molecule and explain its salient features with reference to its bond order and magnetic properties. **(4+3+3=10)**

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