

MSc DEGREE END SEMESTER EXAMINATION - OCT. 2020 : JANUARY 2021**SEMESTER 3 : CHEMISTRY****COURSE : 16P3CHET09 : INORGANIC CHEMISTRY - III***(For Regular - 2019 Admission and Supplementary - 2016 / 2017/ 2018 Admissions)*

Time : Three Hours

Max. Marks: 75

PART A**Answer any 10 (2 marks each)**

1. What is levitation?
2. Explain the structure of rhenium trioxide.
3. Arrange the following metal oxides in the increasing order of their Neel's temperature.
MnO, FeO, NiO, CoO
4. There is no significant deviations from stoichiometry for group 2 metal oxides unlike 3-d metal oxides. Why?
5. Materials with metal excess and metal deficiency defects are termed as n-type and p-type semiconductors respectively. Why?
6. Explain the terms: Burgers vector and small angle tilt boundary
7. What are octahedral metal clusters? Give examples.
8. With the help of an example, discuss the synthesis of binuclear metal cluster.
9. What is thermal spalling?
10. Discuss on the magnetic properties of KCP.
11. How P_4S_4 is prepared? Give the structures of its α and β forms.
12. Illustrate the role of Zeolites as shape selective catalyst.
13. Predict the stability of $[(C_5H_5)_2Fe]^+$ using MNO rule.

(2 x 10 = 20)**PART B****Answer any 5 (5 marks each)**

14. Distinguish between spinels and inverse spinels.
15. Describe the Kronig-Penney model.
16. Discuss the nonstoichiometric defects of the 3-d metal monoxides with special reference to their electronic properties
17. Describe experimental methods for determining the diffusion coefficient in metallic and ionic solids
18. Explain the basis of the different colour exhibited by gemstones.
19. Discuss on the classification of ceramic materials.
20. Write a note on heteropoly ions. What are heteropoly blues? Give an account of their uses.
21. How are silicones prepared? Explain its structure and bonding.

(5 x 5 = 25)**PART C****Answer any 2 (15 marks each)**

22. Discuss the BCS theory of superconductivity.
23. Give a brief account on a) Order disorder transition, b) Intermetallic compounds and c) Chemical vapour deposition technique.
24. List out some of the heterocyclic inorganic ring systems of Sulphur and phosphorous. Give their synthesis, structure and conformations. Explain the special features of bonding.
25. Explain in detail the magnetic, electrical and optical properties of one dimensional solids by giving suitable examples.

(15 x 2 = 30)