

Reg. No

Name

18P3606

MSc DEGREE END SEMESTER EXAMINATION - OCTOBER 2018
SEMESTER 3 : CHEMISTRY
COURSE : 16P3CHET09 : INORGANIC CHEMISTRY - III
(For Regular - 2017 Admission & Supplementary - 2016 Admission)

Time : Three Hours

Max. Marks: 75

Section A
Answer any 10 (2 marks each)

1. Distinguish between piezo and inverse piezo electric effect.
2. The Neel's temperature of MnO (122K) is less than for NiO (523K). Why?
3. Solid solution of dark-green Cr_2O_3 and colourless Al_2O_3 form brilliant red ruby. Explain the reason for the colour change.
4. 1st order transitions are easy to detect than 2nd order transition. Why?
5. There is no significant deviations from stoichiometry for group 2 metal oxides unlike 3-d metal oxides. Why?
6. Materials with metal excess and metal deficiency defects are termed as n-type and p-type semiconductors respectively. Why?
7. What are octahedral metal clusters? Give examples.
8. Discuss on the electrical properties of KCP.
9. Determine the styx number of B_5H_{11} .
10. Explain the formation and molecular formula of various isopoly vanadate species.
11. Classify the following carboranes as closo, nido and arachano based on Wade's rule.
 a) $\text{C}_2\text{B}_9\text{H}_{11}$ b) $\text{C}_3\text{B}_6\text{H}_{12}$
12. Arrange the following boranes in the decreasing order of their acidity. Give justification for your answer.
 B_4H_6 , $\text{B}_5\text{H}_9^{2-}$, B_6H_{12} .
13. Describe the synthesis and structure of cyclopolyposphines.

(2 x 10 = 20)

Section B
Answer any 5 (5 marks each)

14. Write briefly on perovskite and related structures.
15. Give an account on electronic properties of monoxides of elements in 3d series.
16. Explain the Czohralski method for crystal growth.
17. Explain the basis of the different colour exhibited by gemstones.
18. Explain in detail the structure and bonding present in $[\text{Re}_2\text{Cl}_8]^{2-}$
19. Explain with suitable examples the occurrence of homo and hetero catenation.

20. How are silicones prepared? Explain its structure and bonding.
21. How condensed phosphates are prepared? Explain the different structural forms of condensed phosphates.

(5 x 5 = 25)

Section C

Answer any 2 (15 marks each)

22. What are high temperature superconductors? Discuss the synthesis, structure and superconductivity in $\text{YBa}_2\text{Cu}_3\text{O}_7$ system.
23. What is phase transition? Discuss various classification of phase transition.
24. Explain in detail the structures, properties and applications of refractory materials.
25. 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.

(15 x 2 = 30)