

2022
B.A./B.Sc.
Third Semester
 CORE – 5
CHEMISTRY
Course Code: CHC 3.11
 (Inorganic Chemistry - II)

Total Mark: 70

Pass Mark: 28

Time: 3 hours

Answer five questions, taking one from each unit.

UNIT-I

1. (a) Discuss the modes of occurrence of metals based on standard electrode potentials. 5
- (b) Write short notes on the following: 2½×2=5
 - (i) Mond's process
 - (ii) Zone refining
- (c) Explain electrolytic reduction. 4
2. (a) Discuss the Ellingham diagram for reduction of metal oxides. 5
- (b) Explain van Arkel-de Boer process for purification of titanium. 4
- (c) Write notes on the following: 2½×2=5
 - (i) Hydrometallurgy
 - (ii) Amalgamation

UNIT-II

3. (a) Define Lewi's acids and bases. Give examples. 2+2=4
- (b) What is HSAB principle? Discuss its application. 2+3=5
- (c) Explain Pearson's concept of hard and soft acids and bases with examples. 5
4. (a) Explain Usonovich concept of acids and bases with examples. 4
- (b) Define Arrhenius acids and bases with examples. 4
- (c) Explain leveling and differentiating solvents with examples. 4

- (d) Arrange the following in the increasing order of acidic strength: 2
- (i) HNO_3 , H_2SO_4 , H_3PO_4
- (ii) HClO , HIO , HBrO

UNIT-III

5. (a) Define inert pair effect. Discuss the relative stability of different oxidation states of group 13 elements. 1+3=4
- (b) What is diagonal relationship? Mention some chemical similarities between lithium and magnesium. 1+3=4
- (c) What are crown ethers? Mention some complexes formed by s-block elements. 1+3=4
- (d) Write short notes on allotropy. 2
6. (a) Define catenation. Give reason why carbon has high tendency to catenate. 2+3=5
- (b) State some anomalous behavior of lithium. 3
- (c) What are hydrides? Discuss its classification. 2+4=6

UNIT-IV

7. (a) What is the acidic character of boric acid? Give chemical equation how does it reacts with ethyl alcohol. 1+2=3
- (b) Discuss with chemical equations how nitric acid oxidized metals. 4
- (c) Give the preparation of $\text{H}_2\text{S}_2\text{O}_8$ (Marshall's acid) by electrolysis of 60% solution of H_2SO_4 and draw its structure. 2+1=3
- (d) Write notes on the following: 2×2=4
- (i) Pseudo halides and pseudo halogens
- (ii) Halides and halogens
8. (a) Give the preparation of borax from colemanite ore and write any two its uses. 2+1=3
- (b) Draw the structure of P_4O_8 and P_4O_{10} . Give example how P_4O_{10} act as dehydrating agent. 3+1=4
- (c) What are silanes? Give any two uses of it. 1+2=3
- (d) Give one method of preparation of H_3PO_4 and $\text{H}_4\text{P}_2\text{O}_7$ and draw their structures. 2+2=4

UNIT-V

9. (a) Discuss the occurrence of noble gases. 3
(b) Explain the nature of bonding in XeF_2 by MO treatment. 4
(c) Write and three points how inorganic polymers differ from organic polymers. 3
(d) Discuss the preparation of cross linked silicones. 4
10. (a) How would you prepare XeF_6 ? Give reason with chemical reactions why XeF_6 cannot be stored in glass or quartz vessels. 1+3=4
(b) Write any three uses of helium. 3
(c) What are phosphazenes? Discuss with examples. 1+2=3
(d) Write short notes on pyrosilicates and chain silicates along with their structures. 2+2=4
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