



THE AMERICAN COLLEGE, MADURAI

(An Autonomous Institution Affiliated to Madurai Kamaraj University)

Re-accredited (2nd Cycle) by NAAC with Grade "A", CGPA – 3.46 on a 4-point scale

Backlog Arrear Examination, March 2021

CHE CHS 2513/CHE 2523 INORGANIC CHEMISTRY-III

Max: 75marks

Time: 3hrs

Answer any FIVE questions:

(5×15 = 75)

1. a) Discuss in detail the band theory of metallic bonds.
b) State Bragg's law and derive Bragg's equation.
c) What is superconductivity? What type of materials are superconductors? (6+5+4)
2. a) Sketch and detailed explanation of structure of the following oxides of N and P.
i) N_2O_3 ii) N_2O_5 iii) P_4O_6 iv) P_4O_{10}
b) Bond angle of trihydrides of group 15 elements decreased as we move down the group. Give your reason. (12+3)
3. a) What do you know about peroxomonosulphuric acid and peroxodisulphuric acid? Discuss their preparation and structures
b) Explain the structures of $SOCl_2$ and SO_2Cl_2 .
c) How sulphuric acid is manufactured by the contact process? (8+4+3)
4. a) Briefly discuss the reactions of halogen molecules towards water.
b) Explain the structures of ClF_3 and IF_7
c) Write short account on basic properties of the halogens. (6+6+3)
5. a) Bring out the difference between co-precipitation and post precipitation.
b) List any four organic precipitants with structure used in gravimetric analysis.
c) Distinguish between
i) Accuracy and precision
ii) Absolute error and relative error
iii) Standard deviation and relative standard deviation (3+3+9)

6. a) Explain the terms i) Anisotropy ii) Space lattice iii) Centre of symmetry

b) Bringout the differences between crystalline and amorphous solids.

c) Explain the nature of bonding in formation of ozone molecule on the basis of molecular orbital theory and valence bond theory.

d) Why is nitrogen anomalous in its behaviour as compared to the other members of its group? (3+3+6+3)

7. a) Account on the various oxidation state of group 16 elements.

b) Explain the energy cycle showing the acid strength of halogen acids.

c) Explain what is meant by precipitation from homogeneous solution? How does this procedure lead to both larger and purer of precipitate?

d) Define common ion effect. (3+6+4+2)
