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 1422/CHE1402 **INORGANIC & PHYSICAL CHEMISTRY-II** **Time: 3 Hours**

Max Marks: 75

Answer any FIVE questions **5X15= 75**

1. a) Explain the factors affecting electron affinity and ionization energy. (7)

   b) State Slater's rule. Describe Pauling and Mulliken scale of electronegativity. (8)

2. a) Predict which element in each of the following pairs has higher ionisation energy and why?

   i) Sulphur, Phosphorous and ii) Iodine, Bromine (5)

   b) Discuss the important applications of electronegativity. (5)

   c) Explain the various steps involved in metallurgical process. (5)

3. a) Write short notes on the following

   i) Van Arkel d-Boer process ii) Hydrometallurgy (5)

   b) What is an Ellingham diagram? Discuss the applications of this diagram. (10)

4. a) How are acids and bases defined in terms of

   i) Arrhenius concept ii) Bronsted-Lowry concept? Give suitable example 10)

   b) What are Latimer diagrams? Explain how a Latimer diagram is converted into reduction half-cell reactions in acidic and basic solutions (5)

5. a) Derive Maxwell's equation in thermodynamics (6)

   b) What is the Clausius-Clapeyron equation and why is it important? (6)

   c) What does Fugacity mean? (3)

6. a) What is the application of third law of thermodynamics? (6)

   b) What is Le Chatelier's principle and why is it important? (9)

7. a) What is Raoult's Law and Henry's law? (4)

   b) How do you use the Lever rule? (3)

   c) How will you determine the Critical Solution Temperature (CST) of phenol-water system. (8)