Time: 1.30 Hours   **Maximum Marks: 40**

Section A (1 mark each)

Answer <u>all</u> questions

1. Define mean free path

2. Define Boyle temperature.
3. Write the value of 'R' in joule
4. Calculate the standard emf of a galvanic cell with electrodes having standard reduction potential as $Zn^{2+}/Zn = 0.76$ V and $Cu^{2+}/Cu = -0.34$ V
5. What is cell constant?
6. Write down Bragg equation. Explain the terms
7. Drops of water are spherical in nature. Why?
8. Draw an (100) plane

                                                                              (1×8=8 Marks)

Section B (2 marks each)

Answer <u>any five</u> questions from the following

9. Derive Nernst equation for the galvanic cell $Cd/Cd^{2+}_{0.1\,M}//Ag^+_{\;0.1\,M}/Ag$

10. What is the need of salt bridge in galvanic cells?

11. Write the equation of Maxwell Boltzmann distribution of molecular velocities

12. Define: a) Average velocity b) RMS velocity.

13. Write a note on compressibility factor Z

14. Write a note on Bravais lattices

15. What are 'F' centres?

16. What are liquid crystals?

                                                                              (2 × 5 = 10 Marks)

Section C (4 marks each)

Answer <u>any three</u> questions from the following

17. Write the postulates of Kinetic theory of gases

18. State and explain the applications of Kohlrausch's law

19. How viscosity is measured using Ostwald viscometer ?

20. Differentiate between smectic and nematic liquid crystals

21. Briefly discuss about i) Schottky defects ii) Frenkel defect

22. Write Vander Waals equation of state and explain the significance of Vander Waals constant a and b.

(4×3 = 12 Marks)

Section D (10 marks each)

Answer <u>any one</u> question

23. a) Write a note on fuel cells
    b) Explain various types of reversible electrodes

24. Derive Bragg's equation

25. a) Explain critical phenomena and critical constants.

    b) How you experimentally determine the critical constants   **(1×10 = 10 Marks)**

S.D. College, Alappuzha

Outcome Based Internal Evaluation Blue Print – 2022-23

Programme Name and Code: B.Sc Chemistry (235)

Semester 1

Course Name and Code: Physical Chemistry I (CH 1541)

Assignment/Seminar

Relevant Course Outcome: Determination of colligative properties and molecular mass of solute	Topic: Write an assignment within 10 pages about elevation of boiling point and depression of freezing point and related numerical problems.

Internal Question Paper – Mapping of Test Items

Course Outcomes	Test Items with Marks
Identify, compare and explain the properties and behaviour of ideal and real gases, knowing kinetic theory of gases and different types of molecular velocities and collision properties.	1. Write the value of 'R' in joule - 1 marks 2. Define mean free path - 1 marks 3. Define Boyle temperature - 1 marks 4. Write the equation of Maxwell Boltzmann distribution of molecular velocities - 2 marks 5. Define: a) Average velocity b) RMS velocity. - 2 marks 6. Write a note on compressibility factor Z - 2 marks 7. Write the postulates of Kinetic theory of gases - 4 marks 8. Write Vander Waals equation of state and explain the significance of Vander Waals constant a and b. - 4 marks 9. a) Explain critical phenomena and critical constants. b) How you experimentally determine the critical constants - 10 marks
Differentiate between amorphous and crystalline solids, Understand anisotropy, symmetry and types of crystals, X- ray diffraction methods of study of crystal structure, identify the imperfections in crystals	1. Write down Bragg equation. Explain the terms - 1 marks 2. Write a note on Bravais lattices - 2 marks 3. What are 'F' centres? - 2 marks 4. Briefly discuss about i) Schottky defects ii) Frenkel defect - 4 marks 5. Derive Bragg's equation - 10 marks
Representation of lattice planes and calculation of interplanar spacing, draw the crystal structures of NaCl and CsCl	1. Draw an (100) plane - 1 marks
Understand the physical aspects of surface tension and viscosity of liquids and the basics of	1. What are liquid crystals? - 1 marks 2. How viscosity is measured using Ostwald viscometer ? - 4 marks

liquid crystals and their applications	3. Differentiate between smectic and nematic liquid crystals - 4 marks
Design and Determine the potentials of electro-chemical systems	1. Calculate the standard emf of a galvanic cell with electrodes having standard reduction potential as $Zn^{2+}/Zn = 0.76$ V and $Cu^{2+}/Cu = -0.34$ V - 1 marks 2. What is cell constant? - 1 marks 3. Derive Nernst equation for the galvanic cell $Cd/Cd^{2+}_{0.1\ M}//Ag^{+}_{0.1\ M}/Ag$ - 2 marks
Understand the working principle Electro-Chemical cells	1. What is the need of salt bridge in galvanic cells? - 2 marks 2. State and explain the applications of Kohlrausch's law - 4 marks 3. a) Write a note on fuel cells b) Explain various types of reversible electrodes - 10 marks

SANATANA DHARMA COLLEGE, ALAPPUZHAA

First Semester B.Sc. Degree Internal Examination August-2022

CH 1141: Inorganic Chemistry I

Time: 1.30 Hours   **Maximum Marks: 40**

Section A (1 mark each)

(Answer in one word/2 sentences) Answer all questions

1. State Heisenberg uncertainty principle

2. What is shape of s orbital

3. State Pauli's exclusion principle

4. Name the element having maximum electronegativity

5. Give an example of Arrhenius acid

6. …...is an example for aprotic solvent

7. State Lux Flood concept of acids and bases ?

8. Give an example of hard acid   `   **(1×8=8 Marks)**

Section B (2 marks each) (Short answer type)

Answer any three questions from the following

9. Discus about auto ionization of water

10. Briefly explain about acid base property of a compound in liquid ammonia medium?

11. What is meant by leveling effect of a solvent

12. State Lux Flood concept of acids and bases

13. The quantum numbers n=3, l=1 corresponds to which orbital? Draw the shape of the orbital?

14. Calculate the de Broglie wavelength of an electron moving with a velocity of 5x 10^8 cm/s?

15. What is meant by the term wave function? What is its significance?

(2 × 3 = 6 Marks)

Section C (4 marks each)

Answer any three questions from the following

16. State Bronsted Lowry concept of acids and bases sand discuss about conjugate acis and bases?

17. Give an account of Pauling's electronegativity scale

18. Discuss slater's rule and its applications

19. What are quantum numbers ? give the significance of each

20. Discuss about liquid ammonia solutions of alkali metals

(4×4 = 12 Marks)

Section D (10 marks each)

Answer any one question

21. Briefly discuss about SHAB principle and its applications

22. Discuss about reactions in liq SO2

23. State and explain the terms used in Schrodinger equation. What is meant by probability of locating electron in space? Sketch the shapes of p -orbitals

(1×10=10 Marks)

Outcome Based Internal Evaluation Blue Print – 2022-23

Programme Name and Code: B.Sc Chemistry (235)
Semester 1

Course Name and Code: Inorganic Chemistry I (CH 1141)

Assignment/Seminar

Relevant Course Outcome: Define various concepts of acids and bases.	Topic: Write an assignment within 10 pages about SHAB Principle and its applications

Internal Question Paper – Mapping of Test Items

Course Outcomes	Test Items with Marks
Discuss the course of development of structure of atom	1. State Heisenberg uncertainty principle - 1 marks 2. What is shape of s orbital - 1 marks 3. The quantum numbers n=3, l=1 corresponds to which orbital? Draw the shape of the orbital? - 2 marks 4. Calculate the de Broglie wavelength of an electron moving with a velocity of 5×10^8 cm/s? - 2 marks 5. What is meant by the term wave function? What is its significance? - 2 marks 6. What are quantum numbers ? Give the significance of each - 4 marks 7. State and explain the terms used in Schrodinger equation. What is meant by probability of locating electron in space? Sketch the shapes of p -orbitals - 10 marks
Apply rules for filling electrons in classifying elements into s, p,d and f blocks	1. State Pauli's exclusion principle - 1 marks
Define various scales of electronegativities and their applications	1. Name the element having maximum electronegativity - 1 marks 2. Give an account of Pauling's electronegativity scale - 4 marks
Define various concepts of acids and bases.	1. Give an example of Arrhenius acid- 1 marks 2. State Lux Flood concept of acids and bases - 1 marks 3. Give an example of hard acid - 1 marks 4. State Bronsted Lowry concept of acids and bases sand discuss about conjugate acis and bases - 4 marks 5. Briefly discuss about SHAB principle and its applications - 10 marks
Understand reactions in non aqueous solvents.	1. …..is an example for aprotic solvent - 1 marks 2. Discus about auto ionization of water - 2 marks 3. Briefly explain about acid base property of a compound in liquid ammonia medium? - 2 marks 4. What is meant by leveling effect of a solvent - 2 marks

	5. Discuss about liquid ammonia solutions of alkali metals - 4 marks 6. Discuss about reactions in liq SO_2 - 10 marks
Define Effective nuclear charge and Slater's rules	1. Discuss Slater's rule and its applications - 4 marks