

**SIXTH SEMESTER B.Sc. DEGREE EXAMINATION, APRIL 2025****(Regular/Improvement/Supplementary)****CHEMISTRY****GCHE6B11T: PHYSICAL CHEMISTRY–III****Time: 2 Hours****Maximum Marks: 60****SECTION A: Answer the following questions. Each carries *two* marks.  
(Ceiling 20 marks)**

1. Name two intrinsic semiconductors.
2. An aqueous solution of urea freezes at 0.19 K lower than normal freezing point of water. Find its molality?  $K_f$  of water is  $1.86 \text{ K kg mol}^{-1}$
3. Determine the degree of ionization of 0.02M solution of ammonia. The ionization constant of ammonia is given as  $1.77 \times 10^{-5}$
4. Give an example for an anion reversible electrode.
5. Mention the future importance of hydrogen oxygen fuel cell.
6. Draw the titration curve for conductometric titration of a weak acid against strong base.
7. Explain why the colligative properties of certain solutes differ considerably from expected values.
8. How does the molar conductivity of a strong and weak electrolyte vary with dilution?
9. Give the Henderson equation for a basic buffer.
10. Draw the (220) plane of face centered cubic lattice.
11. Write Bragg equation and state the terms involved.
12. Give a consequence of the presence of Frenkel defect in crystals.

**SECTION B: Answer the following questions. Each carries *five* marks.  
(Ceiling 30 marks)**

13. Explain moving boundary method for the determination of transport number.
14. Discuss the observable consequences of surface tension in real life situations.
15. Explain common ion effect with example.
16. How will you determine the molecular mass of a polymer using viscosity measurements?
17. Discuss the crystal systems with examples.
18. Explain the term electrophoretic effect and implied in the Debye-Huckel theory of strong electrolytes.
19. Elaborate the structural features of different class of liquid crystals.

**SECTION C: Answer any *one* question. The question carries *ten* marks.**

20. Explain any two applications of EMF measurements in detail.
21. Discuss the crystal structure of calcium fluoride.

**(1 × 10 = 10 Marks)**