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Name: .....

Reg.No: .....

**SIXTH SEMESTER B.Sc. DEGREE EXAMINATION, APRIL 2024**

(CBCSS - UG)

(Regular/Supplementary/Improvement)

**CC19U CHE6 B11 - PHYSICAL CHEMISTRY - III**

(Chemistry - Core Course)

(2019 Admission onwards)

Time : 2.00 Hours

Maximum : 60 Marks

Credit : 3

**Part A** (Short answer questions)

Answer *all* questions. Each question carries 2 marks.

1. State faraday's second law of electrolysis.
2. State and explain kohlrusch's law.
3. What is the limitation of the Debye-Huckel-Onsager equation?
4. The molar ionic conductances at infinite dilution of  $Mg^{2+}$  and  $Cl^-$  ions are respectively 106 and 76.25 S  $cm^2 mol^{-1}$  at a certain temperature. Calculate the molar conductance at infinite dilution of magnesium chloride solution at that temperature.
5. What is liquid junction potential? How can it be eliminated?
6. Sketch the general shape of the potentiometric titration curve for a strong acid-strong base titration.
7. Define ebullioscopic constant.
8. Define the term osmotic pressure. How does the osmotic pressure of a given solution vary with temperature?
9. Define ionic product of water. How is it related to hydrolysis constant of a salt of weak base and strong acid?
10. Define Weiss indices
11. Explain structure of CsCl,
12. What are F-centers?

**(Ceiling: 20 Marks)**

**Part B** (Short essay questions - Paragraph)

Answer *all* questions. Each question carries 5 marks.

13. What is meant by ionic mobility? How ionic mobility depends on its transport number?

14. Give a rough sketch of the conductometric titration curves that would be obtained for the following titrations and explain. (i) KOH vs H<sub>2</sub>SO<sub>4</sub> (ii) K<sub>2</sub>CO<sub>3</sub> vs HNO<sub>3</sub>.
15. How is the pH of a solution determined using the quinhydrone electrode ?
16. Explain the two kinds of capillary action and meniscus formation observed in different liquids.
17. Mention the applications of buffer solutions.
18. Explain the rotating crystal method for the X-ray diffraction studies of crystals.
19. Distinguish between n type and p type semiconductors.

**(Ceiling: 30 Marks)**

**Part C (Essay questions)**

Answer any *one* question. The question carries 10 marks.

20. What is E.M.F of a cell? Describe the potentiometric method of determining the EMF of a cell.
21. Explain the modes of three-dimensional close-packing of uniform spheres Discuss the structures of (a) sodium chloride and (b) cesium chloride.

**(1 × 10 = 10 Marks)**

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