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(Pages : 2)

Name.....

Reg. No.....

SIXTH SEMESTER U.G. DEGREE EXAMINATION, MARCH 2022

(CBCSS—UG)

Chemistry

CHE 6B 11—PHYSICAL CHEMISTRY—III

(2019 Admissions)

Time : Two Hours

Maximum : 60 Marks

Section A (Short Answers)

Answer at least **eight** *questions.*
Each question carries 3 *marks.*
All questions can be attended.
Overall Ceiling 24.

1. The specific conductance decreases with dilution while the molar conductance increases to certain extend. Why ?
2. Using suitable example write the importance of solubility product in qualitative analysis.
3. Write the advantages of conductometric titration over titrations using indicators.
4. What happen when nitrogen gas is bubbled through ammonia solution ?
5. Calculate the osmotic pressure of a 0.1 M aqueous solution of an organic solute at 17°C. ($R = 0.0821$ L atm K^{-1} mol^{-1}).
6. Hydrogen chloride gas is passed through common salt for its purification process. What is the principle involved ?
7. What do you understand by space lattice and unit cell ?
8. Calculate the Miller indices of a crystal plane which passes through the crystal axes at 2a, 3b, c.
9. What is Frenkel defect ? How it affect the density of the crystal ?
10. What do you mean by intrinsic conductors ? Write two examples.
11. What is salt bridge why it is used ?
12. Write the oxidation-reduction process involved in the hydrogen-oxygen fuel cell.

(8 × 3 = 24 marks)

Turn over

Section B (Paragraph)

Answer at least **five** *questions.*
Each question carries 5 *marks.*
All questions can be attended.
Overall Ceiling 25.

13. Briefly discuss the band theory of metals.

14. Briefly discuss the hep and ccp arrangements in crystal.

15. How will you determine the molecular mass of a non-ionic solid by elevation in boiling point method ?

16. How will you determine viscosity of a liquid using Ostwald Viscometer ?

17. Briefly discuss the mechanism of buffer action in a mixture of weak base and its salt and derive the Henderson equation.

18. How will you determine pH of a solution using quinhydrone electrode.

19. How e.m.f. measurements help for the calculation of the thermodynamic parameters, ΔH, ΔS and ΔG.

(5 × 5 = 25 marks

Section C (Essay)

Answer any **one** *question.*
The question carries 11 *marks.*

20. Derive Bragg's equation. Explain how you will determine the crystal structure of NaCl by rotating crystal method. Predict the difference that can observed in the interplanar distance of KCl and NaCl even though both have same type unit cell.

21. Briefly discuss the Debye-Huckel theory for strong electrolytes. Write Debye-Huckel-Onsager equation and explain the terms involved. Briefly explain the effect of high AC frequencies and High potential gradients in the conductivity of strong electrolytes.

(1 × 11 = 11 marks