

C 4362

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Name.....

Reg. No.....

**SECOND SEMESTER (CBCSS—UG) DEGREE EXAMINATION
APRIL 2021**

Chemistry

CHE 2C 02—PHYSICAL CHEMISTRY

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. Give the statement of first law of thermodynamics and its mathematical formulation.
2. Define term unit cell and space lattice.
3. A crystal plane makes intercepts of $(1/2a, 1/2b, c)$. What are miller indices of plane ?
4. Define average velocity and most probable velocity.
5. Write down van der Waals equation for n moles of real gas and explain the terms.
6. Define term vapour pressure of a liquid. How does it depend on temperature ?
7. What are the factors that influence viscosity of a liquid ?
8. State and explain Boyle Vant Hoff law.
9. What are strong electrolytes ? Give two examples.
10. The cell constant of a cell is 0.5 cm^{-1} . The resistance of an electrolyte solution taken in cell is 50 ohms. Calculate conductivity of solution.
11. What is meant by standard electrode potential ?
12. What are buffer solutions ? Give two examples.

(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. Define enthalpy and free energy. How is enthalpy change in process related to free energy change? Under what condition would a process for which $\Delta H = +$ and $\Delta S = -$ ve take place spontaneously?
14. Diethyl ether boils at 35°C . Its heat of vaporization at its boiling point is 27.2 KJ mol^{-1} . Calculate entropy of vaporization?
15. At what temperature would hydrogen gas molecules have same average speed as Helium atoms at 300 K .
16. State and explain second law of thermodynamics. Explain criterion for spontaneous process in terms of entropy change.
17. Describe how osmotic pressure of solution can be measured experimentally.
18. What do you understand by surface tension of liquids and what is the unit? Explain term interfacial surface energy. Explain surface tension on basis of intermolecular attraction.
19. What are fuel cells? Explain the electrode and cell reaction in a $\text{H}_2 - \text{O}_2$ fuel cell. List advantage of fuel cell.

(5 × 5 = 25 marks)

Section C (Essay)

Answer any **one** question.

The question carries 11 marks.

20. Give reasons for deviation of real gases from ideal behavior.
21. (a) Derive Ostwald's dilution law and mention its limitations.
(b) Explain why an aqueous solution of potassium acetate is basic while that of ammonium nitrate is acidic.

(1 × 11 = 11 marks)