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Name.....

Reg. No.....

SECOND SEMESTER B.A./B.Sc. DEGREE EXAMINATION, APRIL 2020

(CBCSS—UG)

Chemistry

CHE 2C 02—PHYSICAL CHEMISTRY

(2019 Admissions)

Time : Two Hours

Maximum : 60 Marks

Section A (Short Answers)

Answer questions up to 20 marks.

Each question carries 2 marks.

1. Define free energy. How is free energy change related to enthalpy and entropy change in a process at constant temperature ?
2. What are Bravais lattices ? How many Bravais lattices are possible ?
3. Find miller indices of plane making intercept on axes at $(-a, b, \alpha)$.
4. Distinguish between most probable velocity and root mean square velocity.
5. What are the causes of deviation of real gas from ideal behaviour ?
6. Define viscosity of a liquid. How does it vary with temperature ?
7. What are colligative properties ? Give two examples.
8. What is an isotonic solution ? Write an expression for it.
9. What is specific conductance ? How is it related to equivalent and molar conductance ?
10. The conductivity of decimolar solution of an electrolyte is $0.0025 \text{ ohm}^{-1} \text{ cm}^{-1}$. It offers a resistance of 350 ohm when taken in conductivity cell. Calculate cell constant.
11. What is meant by reference electrode ? Give an example.
12. What is buffer action ? Give an example.

Turn over

Section B (Paragraph)

Answer questions up to 30 marks.

Each question carries 5 marks.

13. State second law of thermodynamics. Explain criterion for spontaneous process in terms of entropy change.
14. Explain term entropy. What is the physical significance of entropy ?
15. ΔH and ΔS for the reaction $2\text{NO}_{(g)} + \text{O}_{2(g)} \rightarrow 2\text{NO}_{2(g)}$ at 700K are $- 112.9 \text{ KJ}$ and $- 145.5 \text{ JK}^{-1}$. Calculate ΔG and predict whether reaction is spontaneous or not at 700K.
16. How do Frenkel defect arise ? What is the cause of Schottky defects ?
17. Describe the Berkley and Hartleys method of determining osmotic pressure of a solution.
18. State and explain Kohlrausches law and its applications.
19. Calculate osmotic pressure of a solution by mixing 200 ml each of 5% aqueous solution of glucose ($\text{C}_6\text{H}_{12}\text{O}_6$) and 4% solution of urea [$\text{CO}(\text{NH}_2)_2$] at 300K. $R = 0.0821 \text{ Latm K}^{-1}\text{mol}^{-1}$.

Section C (Essays)

Answer any **one** questions.

The question carries 10 marks.

20. Derive Bragg's equation and mention its application.
21. (a) What is meant by term standard electrode potential ? Outline method for its determination
(b) Write a brief note on fuel cells.