**C 23851** **(Pages : 2)** **Name.....**

**Reg. No.....**

**SECOND SEMESTER (CBCSS—UG) DEGREE EXAMINATION**
**APRIL 2022**

Chemistry

CHE 2C 02—PHYSICAL CHEMISTRY

(2019—2020 Admission)

Time : Two Hours Maximum : 60 Marks

**Section A (Short Answers)**

*Answer questions up to* 20 *marks.*
*Each question carries* 2 *marks.*

1. Calculate internal energy produced when 800J of work is done on a system which gives off 220 J of heat.
2. Explain term isotropy and anisotropy.
3. Calculate miller indices of plane which cut through axis at (2a, –3b, –3c).
4. Distinguish between average velocity and root mean square velocity.
5. In what units can Vander Waals constant be expressed and why ?
6. Define surface tension of a liquid. What is its unit ? How does it vary with temperature ?
7. Explain reverse osmosis and its use.
8. State and explain Charles-Vant Hoff law.
9. Define specific conductance of an electrolyte solution. What is the unit ?
10. The conductivity of IM $H_2SO_4$ at 298K is 0.26 $ohm^{-1}$ $cm^{-1}$. Calculate equivalent conductivity of solution.
11. What is a calomel electrode ?
12. Give an example each for acidic and basic buffers.

**Section B (Paragraph)**

*Answer questions up to* 30 *marks.*
*Each question carries* 5 *marks.*

13. State and explain zeroth law of thermodynamics and bring out its significance.
14. For reaction : $N_2 + 3H_2 \longrightarrow 2NH_{3(g)}$ $\Delta H^o = -92.22KJ$ and $\Delta S^o = 0.1981KJK^{-1}$ at 25°C. Calculate standard free energy of formation of $NH_3$ at 25°C.
15. Show that decrease in Gibbs free energy in a process is equal to useful work done by system.

**Turn over**

16. Give Maxwell's equation for distribution of molecular velocities. Explain influence of temperature on distribution.

17. What are isotonic solutions ? A 4.75% aq. solution of solute X found to be isotonic with 2.9% solution of urea at 298K. Calculate molar mass of solute.

18. What do you understand by viscosity of liquids ? What are the factors affecting viscosity of liquids ? Explain viscosity and temperature on basis of intermolecular attraction.

19. The resistance of 0.01 M solution of an electrolyte was found to be 212 ohm at room temperature when taken in a cell containing electrodes of area 2.25cm$^2$ placed 2cm apart. Calculate molar conductance of solution at same temperature.

**Section C (Essay)**

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

20. Discuss defects in crystal system with suitable example and diagram.

21. Illustrate the principle of conductometric titrations with reference to acid base titrations.

(1 × 10 = 10 marks)