Reg. No ..... Name **25U642**

B. Sc. DEGREE END SEMESTER EXAMINATION - MARCH 2025

SEMESTER 6 : CHEMISTRY

COURSE : **19U6CRCHE11 : PHYSICAL CHEMISTRY – III**

(For Regular 2022 Admission and Supplementary 2021/2020/2019 Admissions)

Time : Three Hours Max. Marks: 60

PART A

Answer All (1 mark each)

1. What is meant by number density of a gas?
2. Determine the Miller indices for a crystal plane which cut through the crystal axes at (2a,3b,c).
3. Define collision diameter of a gas.
4. The principal axis for a linear molecule is
5. Give the SI unit of surface tension.
6. Write two examples for AX type ionic compounds?
7. What is the limitation of Langmiur adsorption isotherm?
8. The symmetry element possessed by all molecules irrespective of their point group is ----------.

(1 x 8 = 8)

PART B

Answer any 6 (2 marks each)

9. Depict graphically the extent of adsorption with temperature for physical and chemical adsorptions.
10. Differentiate between crystalline and amorphous solids.
11. Describe the significances of van der Waal's constants '*a*' and '*b*'.
12. What is Powder method in X-Ray crystallography?
13. How will viscosity vary with pressure?
14. Deduce the point group of BF_3 and CO_2.
15. Briefly describe Claude's process of liquefaction of gases.
16. Write the BET equation. Give its significance.

(2 x 6 = 12)

PART C

Answer any 4 (5 marks each)

17. Differentiate between Weiss and miller indices. Draw a crystal plane with X, Y, Z intercepts at (1 1 1) and (0 0 1).
18. Determine the no. of atoms in (a) fcc and (b) bcc systems and their packing efficiency.
19. Briefly discuss the derivation of van der Waal's equation of state.
20. Give Maxwell's equation for the distribution of molecular velocities. Sketch the distribution curve for two different temperatures and explain the influence of temperatures on distribution.
21. Give the point group of ethylene. Describe and represent each of the symmetry elements present in Ethylene.
22. A liquid state represents an intermediate state between solid state and gasesous state. Justify the statements with suitable points.

(5 x 4 = 20)

PART D

Answer any 2 (10 marks each)

23. What do you mean by adsorption? Give the different types of adsoption. Explain the applications of adsorption.

24. a) Explain the viscosity of a liquid.
    b) What are the factors that affect viscosity?
    c) How can viscosity of liquids be determined experimentally?

25. Draw a table showing the seven crystal systems, their edge length, angle between the faces and respective examples.

26. (a) Discuss the different molecular velocities and how are they related to each other.
    (b) Fresh air is composed of N_2 (78%) and O_2 (21%). Find the rms velocity of N_2 and O_2 at 20^0C.

(10 x 2 = 20)