TB245969D

Reg. No :.....

Name :.....

BACHELOR'S DEGREE (C.B.C.S) EXAMINATION, NOVEMBER 2024

2022 ADMISSIONS REGULAR

SEMESTER V - CORE COURSE (CHEMISTRY)

CH5B07B18 - Physical Chemistry - I

Time : 3 Hours **Maximum Marks : 60**

Part A

I. Answer any Ten questions. Each question carries 1 mark **(10x1=10)**

1. Calculate the average velocity of Chlorine molecule at 27°C.
2. Define collision diameter.
3. Distinguish mean free path and free path.
4. Calculate the temperature at which RMS velocity of chlorine gas be equal to sulphur dioxide at STP.
5. The X-ray diffraction pattern of a crystalline substance gave $\sin^2\theta$ ratio as 1:2:3:4:5:6:8. Identify the lattice type of the crystal.
6. Identify the smallest portion of the lattice. A) Lattice structure B) Lattice point C) Brevais lattice D) Unit cell.
7. Review the influence of temperature on physisorption.
8. Recall the unit cell parameters of a tetragonal crystal.
9. Recall the equation for Freundlich Adsorption Isotherm.
10. Identify the basic principle of Ostwald viscometer.
11. Memorize Poiseuilles equation and explain the terms.
12. Differentiate laminar and turbulent flow of liquids

Part B

II. Answer any Six questions. Each question carries 5 marks **(6x5=30)**

13. A) Discuss the dependance of coefficient of viscosity of a gas on i) Temperature ii) Pressure iii) Mean free path.
    B) The RMS velocity of Hydrogen gas at STP is 1.83×10^5 cm/sec and its mean free path is 1.78×10^{-5} cm. Calculate the collision number at STP.
14. Derive the law of corresponding states from van der Waal's equation and explain its significance.
15. A) Glass is an amorphous solid. Establish. B) A crystal is made up of 2 elements P & Q where P atoms are at the corners and Q atoms are at the face centre. Predict its formula.
16. Illustrate the use of BET isotherm in determining the surface area of solid adsorbents.
17. A) Calculate the effective number of iron metal atoms per unit cell if it has a) FCC lattice b) BCC lattice.
18. Discuss the postulates of BET isotherm?
19. Define micelle. Explain critical micelle concentration. Discuss the mechanism of micelle formation.
20. Explain electrophoresis. How does this phenomenon provide information about the sign of charge on colloids.
21. Explain the principle of stalagmometer. Discuss the surface tension measurement using drop number method.

Part C

III. Answer any Two questions. Each question carries 10 marks **(2x10=20)**

22. Derive Kinetic gas equation. List the postulates of Kinetic theory of gases.
23. Starting from van der Waal's equation for 1 mole of a gas, obtain its virial form and derive Boyle's temperature.
24. List the different types of adsorption. Explain each. Describe the factors influencing adsorption.
25. Explain briefly the different types of point defects in solids.