Roll No. ...:

91034

B. Sc. (Hons.) Chemistry
1st Semester w.e.f. 2012-13
Examination – December, 2022

CHEMISTRY (PHYSICAL CHEMISTRY)

Paper : P-II

Time : Three hours] *[Maximum Marks : 40*

Before answering the questions, candidates should ensure that they have been supplied the correct and complete question paper. No complaint in this regard, will be entertained after examination.

Note : Attempt *five* questions in all, selecting one question from each section. Question No. 1 is ***compulsory***.

1. (a) What is the unit & significance of vander-waal constant 'a'. 1 × 8 = 8

(b) What is the value of compressibility factor(Z) for ideal gas.

(c) Define Adsorption Isobar.

(d) Define Mean Free Path.

(e) Define Enzyme .

(f) Name the primitive unit cell/s which has/have : $\alpha = \beta = \gamma$.

(g) Define Intermolecular forces.

(h) Define Thermography.

SECTION – I

2. (a) Calculate the values of Critical Pressure, Critical Volume & Critical Temperature if the Vander Waal constants for One gram molecule of Carbon dioxide are: 'a' = 3.609×10^6 and 'b' = 42.75 (volume in milliliters & pressure in atmospheres). 4

(b) Give four differences in between ideal gas and real gas. 4

3. (a) Calculate the Reduced pressure of N_2 & NH_3 when each exerts a pressure of 100 atmospheres. The Critical pressures of N_2 & NH_3 are 33.5 atm. and 111.5 atm. respectively. 4

(b) Explain Law of equipartition of energy . 2

(c) To prove that $K.E. = \frac{3}{2}RT$ for one of gas using kinetic gas equation. 2

SECTION – II

4. (a) Explain Maxwell's distribution law of velocity. 4

(b) Calculate the Collision frequency & Mean Free Path of oxygen molecules at 0°C and one atmospheric pressure if the molecular diameter of oxygen molecules is 2×10^{-8} cm. 4

5. (a) Explain BET Equation along with its validity. 4

(b) Give the differences between Physical adsorption and Chemical adsorption. 4

SECTION – III

6. (a) Using X-rays of wavelength 154.1 pm and staring from the glancing angle, the reflection from silver crystal was found to occur at $\theta = 22.20°$. Calculate the spacing between the planes of silver atoms that gave rise to the above reflection. ($\sin 22.20° = 0.3778$). 4

(b) Derive Michaelis-Menten equation. 4

7. (a) Derive Gibbs adsorption equation. 4

(b) A crystal plane has intercepts on the three axes of the crystal as $\frac{1}{3}a, \frac{3}{4}b$ and $\frac{1}{2}c$. What are the Miller indices of the face ? 4

SECTION – IV

8. (a) Define : Rheochor, Parachor, Specific viscocity. 3

(b) Find parachor values of H in decane($C_{10}H_{22}$). Given : $[P]_{CH_2} = 39.0$; $[P]_{C_{10}H_{22}} = 424.2$. 3

(c) Explain the factors which affects the rate of evaporation. 2

9. (a) Give differences in between solids and liquid crystals. 4

(b) Explain the *three* types of liquid crystals. 4