Roll No. .....

91034

B.Sc. (Hons.) Chemistry
1st Semester w.e.f. 2012-13
Examination – November, 2018

CHEMISTRY (PHYSICAL CHEMISTRY)

Paper : P-II

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

After 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***. All questions carry equal marks.

1. (a) Calculate the vibrational degree of freedom for H_2O molecule.
   (b) Define mean free path.
   (c) What do you mean by degree of freedom of motion of a molecule ?
   (d) What is collision frequency ?
   (e) Enzymes are biocatalyst. Explain.
   (f) Define Michaelis constant.
   (g) What are surface active agents ?
   (h) What is Rheochor ? 1 × 8 = 8

P. T. O.

SECTION – A

2. (a) Derive Van der Waals equation of state for n moles of a gas. 4
   (b) What are critical constants ? How are they measured experimentally ? 4

3. (a) Describe the principle of equipartition of energy and calculate the total energy per mole possessed by linear molecule and non-linear molecule. 4
   (b) What is the significance of Van der Waals constant 'a' and 'b' ? 2
   (c) Explain the term : 2
      (i) Boyle temperature
      (ii) Compressibility factor.

SECTION – B

4. (a) Define : 5
      (i) Adsorption
      (ii) Absorption
      (iii) Chemisorption
      (iv) Heat of adsorption
      (v) Absorption isotherms
   (b) What is BET equation ? How it can be used in the determination of surface area of adsorbent ? 3

5. (a) Define most probable velocity, average velocity and root mean square velocity. Write the expression for each and calculate ratio between them. 4
   (b) Derive an expression between mean free path and coefficient of viscosity. 4

SECTION – C

6. (a) Define : 2

(i) Crystal lattice

(ii) Unit cell

(b) Describe the concept of Bravais lattices. 3

(c) Discuss the applications of Gibbs adsorption equation. 3

7. (a) Describe the different elements of Symmetry present in crystal. Define Law of Symmetry. 4

(b) Derive Michaelis-Menten equation. 4

SECTION – D

8. (a) What are liquid crystals ? Explain the difference between crystalline solids, liquid crystals and liquids. 5

(b) Explain the term : 3

(i) Heat of vaporization

(ii) Surface energy

(iii) Parachor

9. (a) Why liquids boils at a lower temperature on mountains than on the sea shores ? 2

(b) Differentiate between viscosity and fluidity. 2

(c) Describe : 4

(i) Nematic liquid crystals

(ii) Thermography