Seat No:_____ Enrollment No:_____

PARUL UNIVERSITY

FACULTY OF APPLIED SCIENCE

M.Sc. Winter 2019-20 Examination

Semester: 2 **Date: 11/12/2019**
Subject Code: 11205153 **Time: 2:00 pm to 4:30 pm**
Subject Name: Physical Chemistry-II **Total Marks: 60**

Instructions:
1. All questions are compulsory.
2. Figures to the right indicate full marks.
3. Make suitable assumptions wherever necessary.
4. Start new question on new page.

Q.1. A) Answer the following: **(08)**
(a) Giving suitable example, Define the term: Assembly of localized systems
(b) Define the term Entropy statistically for an isolated assembly. What does it provide?

Q.1. B) Answer the following questions (Any TWO):
(a) 1. What is meant by the term Partition function? What does it give? **(04)**
2. Define the term: Micro-Canonical Ensemble
(b) What do you understand by the term Statistical Thermodynamics? **(04)**
(c) What is the significance of Partition function? State its applications. **(04)**

Q.2. A) Answer the following questions:
(a) 1.Define the term: Partial Molar Property **(04)**
2. State the Lewis-Randall rule
(b) State the variation of the fugacity of a gas with respect to temperature. How one can find out its value? **(04)**

Q.2. B) Answer the following questions (Any TWO):
(a) Write correct option in your answer sheet for the following three multiple choice questions: **(03)**
1. The unit of fugacity is…….
[A] atm [B] litre.atm
[C] atm^2 [D] none of the above
2. The Approximate method is useful for determining the value of the fugacity of a gas…
[A] at all values of pressure [B] up to moderate values of pressure only
[C] at higher values of pressure only [D] none of the above
3. The value of the Apparent molar property refers to….
[A] solvent and solute of the solution [B] solute of the solution
[C] solvent of the solution [D] none of the above
(b) Explain the graphical behavior of the variation of fugacity of a gas as a function of pressure. **(03)**
(c) State the methods used for determining the values of Partial molar quantities. Why the method of Intercept is more useful amongst other methods for determining the values of partial molar properties? **(03)**

Q.3. A) Answer the following: **(08)**
(a) Define the term: Ideal solution. What are its properties?
(b) Giving suitable examples draw the vapor pressure curves for the solutions exhibiting positive deviation from ideal behavior.

Q.3. B) Answer the following questions (Any TWO):
(a) 1. State the characteristic properties of the dilute solution. **(04)**
2. What is the selected standard state for electrolytic solution?
(b) Give the values for the mean ionic activity and mean ionic molality of the electrolyte, $M_{\nu_+} A_{\nu_-}$. **(04)**
(c) Write in brief about the Ionic Strength Principle. **(04)**

Q.4. A) Answer the following questions.
(a) 1. State the influence of pressure on the values of K, K_f and K_c. **(04)**
2. What is the significance of Reaction Isotherm?
(b) When the system is said to be in Thermodynamic Equilibrium? **(04)**

Q.4. B) Answer the following questions (Any two):

(a) Write correct option in your answer sheet for the following three multiple choice questions: **(03)**

1. The molality of any solute in a dilute solution is approximately….
   [A] proportional to the square root of its mole fraction in that solution
   [B] inversely proportional to its mole fraction in that solution
   [C] proportional to its mole fraction
   [D] none of the above
2. Van't Hoff derived the expression for Reaction Isochore considering…
   [A] a constant pressure system
   [B] a constant volume system
   [C] a constant temperature system
   [D] none of the above
3. As per the Reaction Isochore, for an exothermic reaction….
   [A] the equilibrium constant increases with temperature
   [B] the equilibrium constant decreases as the temperature is raised
   [C] the equilibrium constant decreases with temperature
   [D] none of the above

(b) Considering the following general reaction: **(03)**

$aA + bB + \ldots \rightleftharpoons lL + mM + \ldots$

Write the form of the Law of equilibrium. What kind of relationship does it provide?

(c) Write the integrated form of the Van't Hoff equation of over a short range of temperature, considering no limits of integration. How one can use this form of Van't Hoff equation? **(03)**