Seat No:_____ Enrollment No:_____

PARUL UNIVERSITY

FACULTY OF APPLIED SCIENCE

M.Sc. Winter 2019-20 Examination

Semester: 1 **Date: 04/12/2019**
Subject Code: 11205103 **Time: 10:30am to 01:00pm**
Subject Name: Physical Chemistry-I **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 questions: **(08)**

(a) Write about the Chain transfer reaction in the case of Free radical chain polymerization reaction.

(b) State the special features of the Redox polymerization reactions.

Q.1. B) Answer the following questions (Any two)

(a) 1. Define the term: Hetero Chain Inorganic Polymers with suitable example **(04)**
2. Define the term: Ceiling temperature

(b) Give the comparison between Thermoplastic Polymers and Thermosets Polymers **(04)**

(c) Write a note on: Influence of monomer concentration on the Free Radical chain polymerization reaction and molecular weight of the resulting polymer. **(04)**

Q.2. A) Answer the following questions.

(a) 1. Define the term: Degree of polymerization. How is it related to the molecular weight of a polymer? **(04)**
2. Write the expressions for the values of molecular weight of polymers on the basis of number fraction as well as weight fraction.

(b) List out the techniques used for determining the molecular weight of polymers based on the colligative properties as well as size (weight). **(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. Which of the following techniques yields a weight-average molecular weight?
[A]Viscometry [B]Osmometry [C]Light scattering [D]Sedimentation
2. In Emulsion polymerization the initiator is….
[A]soluble in water [B] soluble in monomer [C] insoluble in both [D] soluble in both
3. Which of the following polymerization techniques offers problem of heat dissipation?
[A]Solution polymerization [B]Bulk Polymerization
[C]Emulsion Polymerization [D]Suspension Polymerization

(b) Write the basic difference between bulk- , and solution polymerization technique. **(03)**

(c) How one can determine the value of the $\overline{Mv}$ of a given polymer using viscosity method? **(03)**

Q.3. A) Answer the following questions: **(08)**

(a) Calculate the various degrees of freedom for HCl and H_2O molecules.

(b) What is the principle of Equipartition of energy? Based on this, write the value of the total energy of the gaseous molecule.

Q.3. B) Answer the following questions (Any two)

(a) 1. State the kinetic gas equation and signify the terms involved in it. **(04)**
2. Define the term: Degrees of freedom of a gaseous molecule

(b) Write about the viscosity of gases. **(04)**

(c) On the basis of the use of Kinetic gas equation, derive the Boyle's law and Charle's law. **(04)**

Q.4. A) Answer the following questions.

(a) 1. Define the term: E.M.F. of the galvanic cell **(04)**
2. What is meant by the galvanic cell?

(b) Calculate the electrode potential of copper electrode dipped in 0.1 M $CuSO_4$ solution at 298 K. Given that $E°_{Cu^{+2}/Cu} = 0.34$ V [The value of $2.303 \cdot RT/F = 0.059$] **(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. In EMF measurement, the reference electrode used is…
[A]the quinhydrone electrode [B]the glass electrode [C]silver-silverchloride-potassiumchloirde solution [D] none of the above
2. The compartment of the galvanic cell is known as Cathode compartment in which….
[A]oxidation half-reaction occurs [B] reduction half-reaction occurs [C] oxidation and reduction half-reaction occur [D] none of the above
3. The electrode consists of a non-metal in contact with a solution of its own ions can be represented as…
[A]$Pt/H_2/H^+$ [B]$Pt/O_2/OH^-$ [C]both [D] none of the above

(b) Show how the Nernst equation can be used to calculate the equilibrium constant of the cell reaction. **(03)**

(c) Write about the different types of reversible electrodes used in the reversible cells. **(03)**