

PARUL UNIVERSITY
FACULTY OF APPLIED SCIENCES
M.Sc. Supplementary Examination, Summer 2018-19

Semester:1**Date: 06/04/2019****Subject Code: 11205103****Time: 10.30am to 1.00pm****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: (08)

- (a) What are Polymers? State the basic difference between simple molecules and polymers in terms of any two physical properties.
- (b) Give the names of important polymeric materials useful as rubbers and resins.

Q.1. B) Answer the following questions (ANY TWO):

- (a) 1. Define the term: Heterochain Organic Polymers with suitable example (04)
2. Write the structures of the repeat units for the following polymers:
(i) Polyacrylonitrile
(ii) Polyesters
- (b) Give the basic difference between addition polymerization and condensation polymerization. (04)
- (c) Write a brief note on : Influence of temperature on Free radical polymerization reaction and molecular weight of the resulting polymer. (04)

Q.2. A) Answer the following questions.

- (a) 1. What is meant by the term Polydispersity? (04)
2. Name the two techniques used for determining the value of \overline{M}_n of polymer.
- (b) Give difference between Bulk polymerization technique and Solution polymerization technique. (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. Light scattering technique provides molecular weight, which is
[A] Weight average
[B] Number average
[C] Z-average
[D] Viscosity average
 2. Osmometry technique gives
[A] \overline{M}_n
[B] \overline{M}_w
[C] \overline{M}_v
[D] \overline{M}_z
 3. In which of the following polymerization techniques, the heat dissipation is difficult
[A] Solution polymerization
[B] Bulk polymerization
[C] Suspension polymerization
[D] Emulsion polymerization
- (b) Give the names of the polymerization techniques which are homogeneous in nature. Discuss any one of them. (03)
- (c) Write the values of the weight-average and number- average molecular weights of the polymer. (03)

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

- (a) Enumerate the gas laws.
- (b) Give the names of the different types of molecular velocities.

Q.3. B) Answer the following questions (ANY TWO):

- (a) 1. Define the term: Degrees of Freedom of a gas (04)
2. Define the term: Viscosity
- (b) Calculate the various degrees of freedom of H₂ and CO₂ molecules. (04)
- (c) Explain the Transport Phenomena. (04)

Q.4. A) Answer the following :

- (a) 1. What is the relation between EMF and Free energy? (04)
2. Define the term: Cathode compartment

(b) What is meant by Potentiometric titrations? State its different types. (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)

- The pH of a solution can be determined using
 - Hydrogen electrode
 - Quinhydrone electrode
 - Glass electrode
 - All the above electrodes
- Anode compartment is the compartment of the cell in which
 - oxidation half-reaction occurs
 - reduction half-reaction occurs
 - oxidation and reduction half-reactions occur
 - None of the above
- In EMF measurements, the reference electrode used is
 - the standard calomel electrode (SCE)
 - the quinhydrone electrode
 - the glass electrode
 - None of the above

(b) State the Nernst equation. (03)

(c) Enumerate the applications of EMF measurements. (03)