Seat No. _____ Enrolment No. _____

CVM UNIVERSITY

SURFACE COATING TECHNOLOGY – SEMESTER 1

FEBRUARY 2021 EXAMINATION

Course Code(s): 101470101

Course Title: Chemistry & Technology of Polymer Science

Total Printed Pages : 02

Date: 22/02/2021 **Time: 10.00 am to 12.00 pm** **Maximum Marks: 60**

Instructions:

- Attempt all questions.
- Numbers to the right indicate full marks for each question.
- Make suitable assumptions wherever necessary.

Q.1 **(a)** Answer the following multiple choice questions. **08**

(1) Which of the following is known as living polymer?
a) Cationic b) Anionic c) Free radical d) All

(2) AIBN is used as an initiator in which of the following mechanism of polymerization?
a) Anionic b) Cationic c) free radical d) none

(3) Which of the following technique is used to evaluate $\overline{Mw}$?
a) Membrane osmometry b) Light Scattering
c) Vapor pressure osmometry d) Ubbelohde viscometer

(4) Which of the following is a trifunctional monomer?
a) Ethylene glycol b) Glycerol c) Pentaerythritol d) None

(5) Which of the following is the strongest force?
a) London dispersion b) Dipole interaction
c) H-bonding d) Covalent bond

(6) In hard rubber, which type of cross-linking is observed?
a) Labile b) Light c) High d) None

(7) Chain end degradation is also known as_____.
a) Depolymerization b) Unzipping
c) Both a & b d) None

(8) Which of the following is more thermally stable?
a) Polyethylene b) PTFE
c) Polyphynelene d) Polytetrafluorophenylene

(b) Answer the following (True or False) **08**

(1) In polymerization, p-Nitrobenzene acts as inhibitor.

(2) KNH_2 is used as initiator in Anionic polymerization.

(3) For a monodispersed polymer, $\overline{Mn} = \overline{Mw}$

(4) Functional group of polymer can be determined by IR Spectroscopy.

(5) Tg of polyethylene is higher than polyvinyl alcohol.

(6) As the crystallinity increases, permeability increases.

(7) Crystalline polymers have high solubility than amorphous polymers.

(8) Teflon will thermally degrade faster than polyethylene.

Q.2 Attempt **any Six** of the following. **12**

(1) Define: Initiators and Inhibitors.

(2) Define: Monodispersed and polydispersed polymers.

(3) Discuss principle of GPC.

(4) What is advantage of Ubbelohde viscometer or Ostwald's viscometer?

(5) Define glass transition temperature.

(6) Define labile cross-linking

(7) Define free volume and bound volume in polymer dissolution.

(8) Define degradation of polymers.

Q.3 Describe mechanism and kinetics of free radical polymerization. **8**

OR

Q.3 Describe bulk and solution polymerization techniques. **8**

Q.4 Describe membrane osmometry for determination of molecular weight of polymers. **8**

OR

Q.4 i) Derive the equation of $\overline{Mn}$ and $\overline{Mw}$. **8**

ii) Find out $\overline{Mn}$ and $\overline{Mw}$ for polymer consisting of 3 fractions with molecular weight 1×10^5, 2×10^5 and 3×10^5 gm/mol respectively. Mole fractions of the fraction are found to be 1, 1 and 1 respectively.

Q.5 Describe factors affecting Tg. **8**

OR

Q.5 Define cross-linking and explain how cross-linking affects various properties of polymers. **8**

Q.6 Derive the equation for heat of mixing of polymer dissolution. **8**

OR

Q.6 Describe mechanism of degradation of PVC. **8**

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