

Seat No. _____

Enrollment No. _____

CVM UNIVERSITY

M.Sc. (Polymer Science & Technology) Semester-I

Course Code: 101340101

Course Title: Basic Concept in Polymer Science

Total Number of 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) Deterioration in properties of polymer is called _____.
(i) degradation (ii) decomposition (iii) both i & ii (iv) none of above.
- (2) _____ are thermally unstable compounds and decompose into free radicals.
(i) Initiators (ii) Inhibitors (iii) Radicals (iv) Monomers.
- (3) _____ is the example of heterochain polymer.
(i) Polystyrene (ii) Nylon 6,6 (iii) PMMA (iv) Polybutadine
- (4) All synthetic polymers having polydispersity is _____.
(i) one (ii) greater than one (iii) less than one (iv) average.
- (5) LRO means _____.
(i) long range order (ii) liquid range order (iii) long rubber origin
(iv) last resin order
- (6) _____ is used an initiator in cationic polymerization.
(i) PVA (ii) Benzoyl peroxide (iii) BF_3 (iv) All
- (7) Polymer can suffer degradation due to _____.
(i) fabrication (ii) daily use (iii) both i & ii (iv) none of above
- (8) _____ are low molecular weight non - volatile compound.
(i) Polymer (ii) Rubber (iii) Plasticizer (iv) Filler.

(b) Answer the following (Fill in the blanks and True or False) **(08)**

- (1) Simple compound contain glass transition temperature.
True or False
- (2) Polymer having crystalline and amorphous nature.
True or False
- (3) Silicon polymer is the example of organic polymer.
True or False
- (4) All synthetic polymers having weight average molecular weight is greater than number average molecular weight.
True or False

- (5) Monomer and initiator only used in _____ polymerization technique.
- (6) _____ is the example of natural polymer.
- (7) _____ improves processibility and flexibility.
- (8) _____ can be shaped in to hard utility articles by application of heat & pressure.

Q.2 Attempt **any six** of the following. **(12)**

- (1) Explain degradation by high energy radiation of polyisobutylene.
- (2) Explain mechanism of chain polymerization.
- (3) Write number average molecular weight concept with derivation of formula.
- (4) Enlist various classifications of polymers.
- (5) Why the molecular weight of polymer is expressed in terms of an average value?
- (6) Differentiate between chain end and random chain degradation.
- (7) Consider a polymer sample containing 10% by weight of polymer having molecular weight 10000 and 90% having molecular weight 100000. Calculate the polydispersity.
- (8) Explain the the effect of glass transition temperature on copolymers.

Q.3 Give an account on optical and geometrical isomerism. **(08)**

OR

Q.3 Explain following. **(08)**

1. Thermoplastic & Thermosetting polymers.
2. Addition & Condensation polymers.

Q.4 Give an account on ionic polymerization. **(08)**

OR

Q.4 Discuss following. **(08)**

1. Polycondensation.
2. Emulsion polymerization technique

Q.5 Discuss in detail oxidative degradation with mechanism of rubber oxidation. **(08)**

OR

Q.5 Write a note on thermal degradation. **(08)**

Q.6 Write a note on behavior of crystalline solid towards X-Ray and degree of crystallinity **(08)**

OR

Q.6 Define glass transition temperature. Discuss in detail about state of aggregation of polymer molecule. **(08)**
