

Seat No. _____

Enrolment No. _____

THE CHARUTAR VIDYA MANDAL UNIVERSITY
M.Sc. POLYMER CHEMISTRY – SEMESTER 2
APRIL 2023 (REGULAR) EXAMINATION

Course Title: Polymer Characterization

Course Code: 101520201

Total Printed Pages : 02

Date: 17/04/2023

Time: 10.00 am to 12.00 pm

Maximum Marks: 50

Instructions:

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

Q.1 Answer the following multiple choice questions. **(04)**

- (I) Tensile strength test is ASTM D _____.
(a) 636 (b) 638 (c) 785 (d) 786.
- (II) _____ can affect batch to batch variation in polymerization process.
(a) Temperature (b) Purity of monomer (c) Time (d) All of above.
- (III) _____ can be used as heating media in softening point measurement techniques.
(a) Glycerol (b) Paraffin oil (c) Silicon oil (d) All of above.
- (IV) \overline{M}_w is determined by _____.
(a) GPC (b) HSMO (c) VPO (d) all of above.

Q.2 Answer in brief and to the Point (3 questions of 2 marks each) **(06)**

- (I) Explain hot plate method used for determination of melting point.
- (II) Describe Araphoa smoke test.
- (III) Enlist requirements of insulating polymers.

Q.3 (a) Discuss static and dynamic equilibrium principle. **(05)**

- (b) Write a note on following. **(05)**
1. Cryoscopy.
 2. End group analysis.

OR

(b) Explain in detail about gel permeation chromatography (GPC) technique. **(05)**

- Q.4** (a) Discuss in detail about melt flow index test for thermoplastic polymer. (05)
(b) Explain following. (05)
1. Pyknometer method.
2. Moisture absorption test.

OR

- (b) Explain following. (05)
1. Heat deflection temperature test.
2. Vicat softening point test.

- Q.5** (a) What do you mean by impact test? Discuss in detail about izod impact test. (05)
Enlist various factors effects on test results.
(b) Explain factors affecting following. (05)
1. Flexural test.
2. Dart impact test.

OR

- (b) What do you mean by flammability test? Explain flammability test for (05)
flexible and self-supporting plastics.

- Q.6** (a) Explain the importance of chemical properties in polymer testing. Discuss (05)
in detail about immersion test.
(b) Write a note on environmental stress cracking resistance test (05)

OR

- (b) What is arc resistance of thermoplastics material? Explain different test (05)
procedure in detail.

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THE CHARUTAR VIDYA MANDAL UNIVERSITY
M.Sc. POLYMER CHEMISTRY – SEMESTER 2
APRIL 2023 (REGULAR) EXAMINATION

Course Title: Polymer Processing Technology

Course Code: 101520202

Total Printed Pages : 02

Date: 19/04/2023

Time: 10.00 am to 12.00 pm

Maximum Marks: 50

Instructions:

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

Q. 1 Answer the following multiple choice questions. (04)

- (I) Trapezoidal runners have a taper of _____ per side.
(a) 8° (b) 9° (c) 7° (d) none of above.
- (II) Z – blade mixers are used to prepare _____ moulding compound.
(a) dough (b) solid (c) powder (d) all of above.
- (III) Hollow articles can be produced by _____ casting process.
(a) die (b) dip (c) film (d) slush.
- (IV) Compression ratio = _____.

(a) $\frac{H_F}{H_M}$ (b) $\frac{H_F}{H_M} D$ (c) $\frac{H_M}{H_F}$ (d) $\frac{H_F}{H_M}$

(a) $\frac{H_f}{H_m}$ (b) $\frac{H_f}{H_m} D$ (c) $\frac{H_M}{H_F}$ (d) $\frac{H_F}{H_M}$

Q.2 Answer in brief and to the Point (3 questions of 2 marks each) (06)

- (I) Write a note on twin drum tumbler.
- (II) Define gate. Enlist main functions of gate.
- (III) Explain significance of vented barrel in injection moulding process.

Q.3 (a) Define polymer processing. Explain hygroscopic behaviour and granule characteristic of polymer compound to be considered before processing. (05)

- (b) Explain following. (05)
1. High speed mixture.
 2. Z-blade mixers.

OR

- (b) Write a note on following. (05)
1. Orientation and Shrinkage.
 2. Melt processing of thermosetting plastics.

- Q.4** (a) Write a note on following. (05)
1. Mould heating devices in compression mould.
 2. Moulding defects during compression moulding process.
- (b) Explain the steps involved in blow-moulding process with suitable diagram. (05)

OR

- (b) Give an account on extrusion moulding process used for thermoplastics polymers. (05)

- Q.5** (a) Define nozzle. Explain alignment of nozzle with suitable diagram. Discuss any two types of nozzle used in injection moulding machine. (05)
- (b) Discuss in detail about in line reciprocating screw based injection moulding machine. (05)

OR

- (b) Differentiate between plunger and screw type injection moulding machine (05)

- Q.6** (a) Write a note on following. (05)
1. Dip casting.
 2. Film casting.
- (b) Discuss in detail about vacuum forming and its processing parameters with neat labeled diagram. (05)

OR

- (b) Describe PVC calendering plant with neat labelled diagram. (05)

Seat No. _____

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THE CHARUTAR VIDYA MANDAL UNIVERSITY
M.Sc. Polymer Chemistry Semester-II
April 2023 (Regular) Examination

Course Title: POLYMER ADDITIVES

Course Code: 101520203

Total Printed Pages : 02

Date: 21/04/2023

Time 10:00 am to 12:00 pm

Maximum Marks: 50

Instructions:

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

Que. 1 (a) Answer the following (04)

- (1) _____ is the adhesion of two adjacent layers of film
(a) lubrication (b) blocking (c) friction (d) none of these
- (2) According to additive classification based on specific function,
_____ type of additive used in modify bulk mechanical property
(a) Toughening agent (b) antistatic agent (c) lubricant (d) none of these
- (3) _____ are used as chelating agent
(a) melamine (b) Stearic acid (c) Dibutyl tin maleates (d) None of these
- (4) In addition to normal oxidative reaction, a very rapid _____
process take place in PVC polymer
(a) dehydrohalogenation (b) hydrogenation (c) hydration (d) None of these

Que. 2 Answer the following (06)

- (1) Define additive and write the classification of additive according to their specific function.
- (2) Write the resonance stabilization in primary antioxidant
- (3) Give an account on solid lubricant

- Que. 3 (a)** Write the requirement of stabilizer for halogenated polymer. Explain the special stabilizer for halogenated polymer with degradation mechanism. (05)
- (b) Discuss the following** (05)
1. Discuss the method of incorporation of additives into polymer matrix
 2. Discuss Antiblock additive
- OR**
- (b)** Define lubricant and Explain external, internal lubricants (05)
- Que. 4 (a)** Write the mechanism for polymer degradation. Explain the role of primary stabilizer (05)
- (b) Write a note on following** (05)
1. Discuss the synergistic stabilizer system
 2. Write a note on antistatic agents
- OR**
- (b)** Discuss the burning mechanism of plastics and Explain flame retardant agents (05)
- Que. 5 (a)** Explain thixotropic agent (05)
- (b)** Discuss the blowing agent (05)
- OR**
- (b) Write a note on following** (05)
1. Toughening agent
 2. Adhesion promoter
- Que. 6 (a)** Write a note on plasticizer (05)
- (b)** Explain the mechanism of natural radiation on ageing of plastics and Explain the role of carbon black, pigment as UV absorbers (05)
- OR**
- (b) Discuss the following** (05)
1. Give a brief account on filler
 2. Explain the role of chelating agent

THE CHARUTAR VIDYA MANDAL UNIVERSITY
M. Sc. POLYMER CHEMISTRY – SEMESTER II
APRIL 2023 REGULAR EXAMINATION

Course Title: Industrial Chemistry-II

Course Code: 101520207

Total Printed Pages : 02

Date: 25/04/2023

Time: 10.00 am to 12.00 pm

Maximum Marks: 50

Instructions:

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

Q. 1 Answer the following multiple choice questions. **(04)**

- (I) The product of mass flow rate and specific heat of fluid is known as _____.
- (a) Capacity Ratio (b) Capacity Rate (c) Correction Factor (d) none of these.
- (II) _____ used to join pipe of different diameter.
- (a) Cross (b) Reducer (c) Elbow (d) Bend
- (III) In venturi tube the coefficient of discharge is about _____.
- (a) 0.61 (b) 0.16 (c) 0.98 (d) 0.89
- (IV) Types of Screening Equipment are _____.
- (a) Trommel (b) Oscillating (c) both b & c (d) none of these

Q.2 Answer in brief and to the Point **(06)**

- (I) Write the difference between Grizzly and Trommel.
- (II) Explain Magnetic drum separator.
- (III) Define Valve and their types.

Q.3 (a) Explain the Mechanism of Crystallization. **(05)**

(b) Explain Vibrating Screen and its principle also a variables. **(05)**

OR

(b) Explain the choice of solvent for absorption. **(05)**

- Q.4** (a) Discuss in detail about Orifice Meter. (05)
(b) Explain the Fouling Factor in detail. (05)

OR

- (b) Explain the Nature of Heat Exchanger. (05)

- Q.5** (a) Explain Ball Mill. (05)
(b) What is size reduction? Explain the necessity & energy and power for size reduction. (05)

OR

- (b) Explain Jaw crusher in detail. (05)

- Q.6** (a) Explain Double-Cone Mixture in detail. (05)
(b) Explain liquid with liquid Mixing, (05)

OR

- (b) Explain Vortex in detail. (05)
