



K21P 0971

Reg. No. :

Name :

III Semester M.Sc. Degree (CBSS – Reg./Suppl./Imp.)
Examination, October 2021
(2018 Admission Onwards)
CHEMISTRY
CHE3E.03 : Polymers and Material Chemistry

Time : 3 Hours

Max. Marks : 60

SECTION – A

Answer **all** questions in **one** word or in **one** sentence. **Each** question carries **one** mark.

- Write two examples for natural polymers.
- Write down the structures of polypropylene and polystyrene.
- Write an empirical equation connecting intrinsic viscosity with molecular size.
- What is a homogeneous polymer ?
- Name two high energy radiations which cause polymer degradation.
- Mention the name of a polymer synthesised through solid phase polymerisation.
- Name ore of tantalum and mention its use.
- What is porous bearing ? (8×1=8)

SECTION – B

Answer **any eight** questions. Answer may be in **two** or **three** sentences. **Each** question carries **two** marks.

- What are thermoplastics ? Give two examples.
- Write the rate equation for the free-radical chain polymerization and explain the terms.

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K21P 0971

-2-



- What is meant by living polymer ?
- Mention Colligative properties that are used to measure the molecular mass of polymers.
- How swelling occurs in a polymer ?
- What is meant by fractionation of polymers ? Mention two methods used for the fractionation of polymers.
- What is heterogeneous polymerization ? Mention two methods used for the heterogeneous polymerisation.
- What is a Block Copolymer ? Schematically represent block copolymers.
- What are biodegradable polymers ? Mention the name of a biodegradable polymer.
- What are Die Steels ? Mention one of its use.
- Write about four mechanical properties required for engineering materials.
- What are the different optical properties to be considered for engineering materials ? (8×2=16)

SECTION – C

Short paragraph questions. Answer **any four** questions. **Each** question carries **three** marks.

- State and explain the organic and inorganic polymers. Give two examples for each.
- Explain the mechanism of ring opening polymerization with a suitable example.
- Briefly discuss the viscosity measurement for the determination of molecular size.
- Explain the dissolution of polymer molecules in solution and schematically represent the 'micellar colloid' of soap molecule and 'molecular colloid' of polymer molecule.



-3-

K21P 0971

- What is suspension polymerisation ? Mention two monomers which can be used for solution polymerisation. Write about advantage and disadvantages of solution polymerisation.
- What are refractory materials ? Explain the properties and applications of refractory materials with specific examples. (4×3=12)

SECTION – D

Essay type questions. Answer **four** questions. **Each** question carries **six** marks.

- A) Define condensation polymerization and explain different types of condensation polymerization reactions with suitable examples.

OR

- B) What is Ziegler-Natta Catalyst ? Explain the mechanism of Ziegler-Natta Catalysis.

- A) Explain the use, principle and procedure of GPC.

OR

- B) Explain vapour pressure lowering method to measure the molecular weight of polymer.

- A) Explain the factors affecting thermal and mechanical, degradation of polymers.

OR

- B) What is a graft copolymer ? Write two types of graft copolymerisation reactions with suitable examples.

- A) Explain the following (a) Bearing (b) Hybrid composite and (c) Ceramic materials.

OR

- B) Write short notes on (a) electrical properties and (b) magnetic properties of engineering materials. (4×6=24)