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.

1. Write two examples for natural polymers.
2. Write down the structures of polypropylene and polystyrene.
3. Write an empirical equation connecting intrinsic viscosity with molecular size.
4. What is a homogeneous polymer ?
5. Name two high energy radiations which cause polymer degradation.
6. Mention the name of a polymer synthesised through solid phase polymerisation.
7. Name ore of tantalum and mention its use.
8. 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.

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

P.T.O.

11. What is meant by living polymer ?

12. Mention Colligative properties that are used to measure the molecular mass of polymers.

13. How swelling occurs in a polymer ?

14. What is meant by fractionation of polymers ? Mention two methods used for the fractionation of polymers.

15. What is heterogeneous polymerization ? Mention two methods used for the heterogeneous polymerisation.

16. What is a Block Copolymer ? Schematically represent block copolymers.

17. What are biodegradable polymers ? Mention the name of a biodegradable polymer.

18. What are Die Steels ? Mention one of its use.

19. Write about four mechanical properties required for engineering materials.

20. 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.

21. State and explain the organic and inorganic polymers. Give two examples for each.

22. Explain the mechanism of ring opening polymerization with a suitable example.

23. Briefly discuss the viscosity measurement for the determination of molecular size.

24. Explain the dissolution of polymer molecules in solution and schematically represent the 'micellar colloid' of soap molecule and 'molecular colloid' of polymer molecule.

25. What is suspension polymerisation ? Mention two monomers which can be used for solution polymerisation. Write about advantage and disadvantages of solution polymerisation.

26. 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.

27. 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.

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

OR

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

29. 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.

30. 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)**
