K22P 1378

Reg. No. : .....

Name : .....

III Semester M.Sc. Degree (CBSS – Reg./Sup./Imp.)
Examination, October 2022
(2019 Admission Onwards)
CHEMISTRY
CHE3E.03 : Polymers and Material Chemistry

Time : 3 Hours Max. Marks : 60

SECTION – A

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

1. Give the structure of the monomer of Nylon 6.
2. Draw the schematic structures of block and graft copolymers of the monomers A and B.
3. Which type of molecular weight measurement can be done with light scattering method ?
4. Give Mark-Houwink equation.
5. Give any two examples of cross linking agents used in polymer reactions.
6. Write one example for a solid phase polymerization reaction.
7. Give the composition of aluminium base alloy.
8. Which material is used for die ? **(8×1=8)**

SECTION – B

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

9. What is glassy state and glass transition temperature ?

10. Discuss various configurations of polymers chains with examples.

11. What is living polymerization ? Give one example.

12. How viscosity average molecular weight is determined ?

13. Write in short about the end group analysis in the measurement of molecular weight of polymers.

14. What is the principle behind osmometric method of molecular weight measurement ?

15. Discuss polymers blends and their properties with examples.

16. Write in brief about the gas phase polymerization reaction.

17. Explain the vulcanization process.

18. What are ferrites and give their importance ?

19. Give the technical importance of porous metallic bearing.

20. Explain the properties of hybrid composites and their applications. **(8×2=16)**

SECTION – C

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

21. What is gelation and gel point ? Discuss how gelation occurs in polymers and explain how gel point is estimated.

22. Discuss the effect of temperature and pressure on chain polymerization.

23. Write a note on Flory-Huggins interaction parameter.

24. What are the driving forces for polymer solubility ?

25. Explain the various casting alloys used in die industry.

26. Discuss the synthesis and properties of ceramic materials. **(4×3=12)**

SECTION – D

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

27. A) What is Zeigler-Natta catalyst ? Write a note on the synthesis of polypropylene by Zeigler-Natta catalyst.

OR

B) i) Discuss about glass transition temperature and the factors affecting glass transition temperature.

ii) How T_g affects the properties of polymers ?

28. A) i) What do you understand by molecular weight distribution ?

ii) What are the advantages and disadvantages of narrow and broad molecular weight distribution ?

iii) Describe the determination of MWD by Gel Permeation Chromatography.

OR

B) i) Distinguish between excluded volume and hydrodynamic volume.

ii) How GPC is important in the fractionation of polymers ?

29. A) Explain various processes for the degradation of polymers.

OR

B) Discuss the polymerization reactions in homogeneous and heterogeneous systems.

30. A) Discuss the various magnetic behaviors of materials used in engineering industry.

OR

B) i) Write a short note on the refractory materials.

ii) Briefly discuss about the composite materials and its classification. **(4×6=24)**

———————