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Exam. Code : 210403
Subject Code : 3822

M.Sc. Chemistry 3rd Semester
SURFACE & POLYMER CHEMISTRY
Paper—Course-XVIII

Time Allowed—3 Hours] [Maximum Marks—50

Note :— **Section A :** **ALL** questions are compulsory. Each question carries **1** mark.
Section B : Attempt any ***eight*** questions. Each question carries **3** marks.
Section C : Attempt any ***two*** questions. Each question carries **8** marks.
Log Tables may be asked for.

SECTION—A

1. What do you mean by surface energy ? Give its units.
2. What are hydrophobic interactions ? Explain.
3. Ducks cannot float in water containing too much detergent. Why ?
4. Is adsorption an exothermic or endothermic process ? Justify your answer thermodynamically.
5. Differentiate between adsorption isobar and adsorption isostere.
6. What are fire-resistant polymers ? Give two examples.
7. Enlist the merits of electrically conducting polymers over the pure metallic conductors.
8. What do you mean by kinetic chain length ? Give its significance.
9. Why do rubbers show high degree of elasticity ?
10. What is meant by chain topology ? 1×10=10

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SECTION—B

11. How will you find surface area of an absorbent by means of BET adsorption isotherm ?
12. Enumerate critically the thermodynamics of polymerization.
13. Describe how Force-Area Curve for fatty acid on water accounts for the structure of surface film.
14. Bring out the differences between the mass-action model and phase-separation model in respect of solutions of surfactants.
15. Differentiate between isotactic, syndiotactic and atactic polymers.
16. Describe the calculation of average dimensions of various chain structures of polymers.
17. Explain the basis and applications of viscometry to determine the molar mass of polymers.
18. Explain, Diffusion Coefficient and Frictional Coefficient. How are they related to each other ? Establish the relationship.
19. Write a critical note on liquid crystal polymers.
20. Establish a relationship between Tm and Tg.
21. The intrinsic viscosity of a solution of polyisobutylene at 20°C is 1.60 decilitre per gram. The Mark-Howink constants are $K = 3.6\times10^{-4}$ and $a = 0.68$. Calculate the molecular mass of the polymer.
22. Describe various factors that influence the conductivity of electrically conducting polymers. 8×3=24

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SECTION—C

23. (a) Discuss the kinetics of bimolecular surface reactions based on Langmuir-Hinshelwood mechanism.

    (b) Equal masses of polymer molecules with $M_1 = 10000$ and $M_2 = 100000$ are mixed. Calculate number average and mass average molecular masses.

24. Explain the difference between the following :

    (a) Physical and chemical adsorption.

    (b) Thermoplastic and thermosetting polymers.

25. Describe the light scattering technique. How is this technique used for the determination of molecular mass of polymers ?

26. (a) Explain, how copolymerization can be brought about ?

    (b) Describe the kinetics of free-radical copolymerization.

$2 \times 8 = 16$

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