School of Chemistry and Biochemistry, TIET, Patiala Applied Chemistry (UCB008)

Tutorial Sheet (Chemistry of Polymers)

1. What is polymerization and degree of polymerization? How polymers are classified?
2. Differentiate the following with examples:
   - **(a)** Addition and condensation polymerization
   - **(b)** Homopolymer and co-polymer
   - **(c)** Thermoplastic and thermosetting polymer
3. Why polymers are expressed in terms of average molecular weights? For a polymeric sample, discuss the number average and weight average type of molecular mass.
4. Weight average molecular weight is higher than number average molecular weight in polymers. Explain. What is polydispersity index?
5. In a polymer sample, 30% molecules have a molecular mass 20000, 40% have molecular mass 30000 and rest have 60000. Calculate mass average and number average molecular masses.
6. In a polymer there are 150 molecules of molecular weight 100, 200 molecules of molecular weight 1000 and 300 molecules of molecular weight 10000. Find the number and weight average molecular mass of the polymer and PDI.
7. Calculate the degree of polymerization of vinyl chloride if the number average weight of polymer is 1.31×10^5 g/mol.
8. When 52 g of styrene was polymerized, average degree of polymerization was found to be 1.5×10^5. Calculate the number of styrene molecules in the original sample and number of molecules of polystyrene produced.
9. What is tacticity? Draw and differentiate syndiotactic and isotactic forms of polyvinyl chloride
10. What is threshold molecular weight? How tensile strength, impact resistance and melt viscosity are related to the degree of polymerization? Discuss.
11. What are inorganic polymers? How are their properties different from organic polymers?
12. What are biodegradable polymers? Give two examples each of natural and synthetic biodegradable polymers
13. Which functional groups are generally present in the biodegradable polymers? With the help of suitable examples, explain how the synthetic polymers are also being degraded by biocatalysts (enzymes)?
14. What are conducting polymers? Give examples and their applications
15. Why doping is required in conducting polymers? Explain the mechanism of conduction in n-doped polymers