4/11

2203N1706

Candidate's Seat No : _____

M.Sc. Semester-3 Examination

503

Chemistry (P)

March-2024

Time : 2-30 Hours] **[Max. Marks : 70**

Answer the following:

Que.1 (A) Explain briefly molar masses of polymers. Describe the light scattering method for the determination of molecular weight of a polymer. **07**

OR

(A) Explain briefly poly dispersity index. Explain the viscosity method to determine the molecular weight of a polymer. **07**

(B) Describe the Osmometry method for the determination of the molecular weights of macromolecules. **07**

OR

(B) Explain how the molecular weight of a polymer is related with degree of polymerization. Equal number of molecules with $M_1 = 100000$ and $M_2 = 10,000$ are mixed. Calculate M_n and M_w. **07**

Que.2 (A) Explain the effect of molecular weight and melting point of polymer on glass transition temperature. Explain the importance of glass transition temperature. **07**

OR

(A) Explain briefly the microstructures of polymers based on the chemical and geometrical structure. **07**

(B) Explain the mechanical properties of crystalline polymers. **07**

OR

(B) Explain in brief, the properties of polymers involving large deformations. **07**

Que.3 (A) Explain in brief about the Injection moulding and Blow moulding processes of polymers. **07**

OR

(A) Explain the melt spinning process of a polymer and the post treatments of fibres to make them more useful. **07**

(B) Explain the Calendering process of producing films and sheets. Explain briefly the Die casting process to produce solid objects with desired shape. **07**

OR

(B) Explain Extrusion moulding technique for producing plastic products. **07**

Que.4 (A) Discuss in brief, the dissolution process of a low molecular weight compound and a polymer. **07**

OR

(A) Explain in brief about size and shape of macromolecules in solution. **07**

(B) Explain the general principles of thermodynamics of polymer dissolution process. **07**

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OR

(B) Write note on viscosity of dilute and concentrated polymer solutions. **07**

Que.5 **Answer the following: (Any Seven-Two marks each)** **14**

(i) What is right processing temperature?

(ii) What is the basic principle of Osmometry?

(iii) Which method is most appropriate for determining M_n and by which method we can determine the high molecular weight of a polymer?

(iv) What are the merits of the light scattering method in determination of molecular weight of polymers?

(v) Give the relationship between degree of polymerization and molecular weights of polymers.

(vi) Define intrinsic viscosity and write its relationship with molecular weight of polymer.

(vii) What is poly dispersity index? Is weight average molecular weight is always equal to number average molecular weight?

(viii) Why polymer molecular weights are taken as average?

(ix) Under which condition $M_n = M_w$?

(x) What are the difficulties in polymer processing?