— 9 100 ml of colloidal solution is completely precipitated by addition of 5 ml of 1M NaCl solution. Calculate the coagulation value of NaCl.

Ans:- Suppose coagulation powers of a univalent, bi-valent and tri-valent colloidal solution is P_1, P_2 and P_3 so that

$$P_1 : P_2 : P_3 = x_1 : x_2 : x_3$$

where x_1, x_2 and x_3 are the constants.

Here NaCl solution possesses univalent only

So $P_1 = x_1 \times$ concentration

volume of colloidal sol + vol of ions = vol of sol

$100 + 5 = 105$ ml.

$$P = \frac{5}{105} \quad \text{where } x \to \text{unity}$$

$$= 0.04$$

$$\text{Coagulation value} = \frac{1}{\text{Coagulation power}}$$

$$= \frac{1}{0.04}$$

$$= 25$$

Coagulation value = 25

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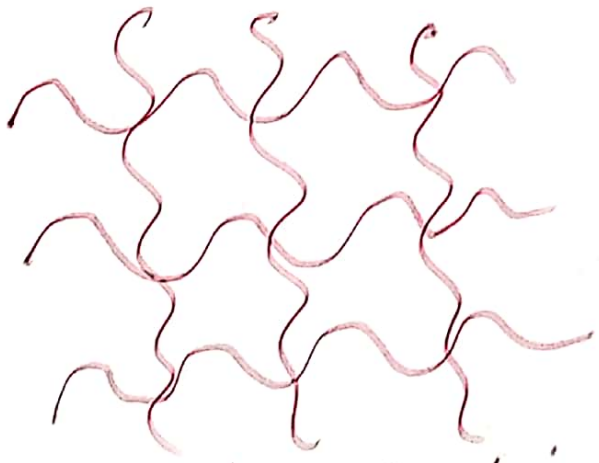
Q:— Why macromolecular solution shows high viscosity ?

Ans:— Macromolecule are the result of combination of monomers which is known as growing chain polymerization comprises Bulk polymerization, Solution polymerization, Suspension polymerization and Emulsion polymerization.

Most of the high polymers are solid, hard and rigid. The solubility depends on the polarity of the solvent. The viscosity of polymers are very high. The factors for high viscosity are

1. polymers are non conductors
2. polymers are ductile and rubbery
3. cooling effect is sensitive
4. Low thermal resistance
5. High additive properties
6. Poor miscibility
7. crystalline and non elastic
8. Net work chain



Net work chain

With possessing all the characteristics the polymers have high viscosity

[N:B:— Questions were given by Gaurab]

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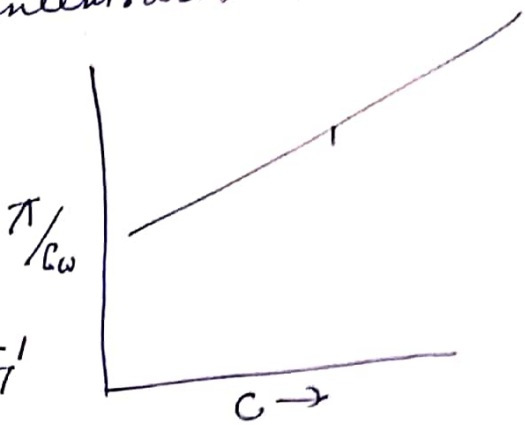
8:— The osmotic pressure of $1m^3$ of a solution containing 2·5 kg of polymer is found to be 250 Pa at 298 K. Assuming that the solution does not deviate from ideal behaviour. Calculate the molar mass of the polymer ? 3

Ans:— Molar mass of the solution can be calculated from the intercept of π/C_w v.s concentration.

$$\frac{\pi}{C_w} = \frac{RT}{M}$$



In case of ideal behaviour

The datas given

$R = 8.314\ J\,K^{-1}mol^{-1}$

$T = 298\ K$

$C_w =$ ~~250 Pa~~ 2·5 kg

$\pi = 760\ mm$ (ideal soln) $= 76\ cm$

$M = ?$

$$M = \frac{RT \times C_w}{\pi}$$

$$= \frac{8.314 \times 298 \times 2.5\ kg}{76\ cm} = 81$$

$$\boxed{M = 81}$$

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