

M.Sc Sem.-2 Examination

P - 407

Polymer Science

June 2022

Time : 2-00 Hours]

[Max. Marks : 50

Instructions: All questions in Section – I carry equal marks.
 Attempt any three questions in Section – I
 Question in Section – II is COMPULSARY

SECTION – I

Q-I	A	Explain electrical properties of polymer with reference to dielectric constant, power factor, dissipation factor, and loss factor	7
	B	What is the effect of polymer branching on the density? Explain with diagram.	7
Q-II	A	Discuss the effect of polymer structure on optical property, clarity, transparency and opacity.	7
	B	Explain with examples homochain polymers and hetero chain polymers.	7
Q-III	A	Explain glass transition temperature with the help of a graphical diagram.	7
	B	Discuss the effect of polymer structure on dielectric constant, power factor, dissipation factor, and loss factor.	7
Q-VI	A	Explain polymer structure in terms of linear, branched, cross-linked and network. Show with diagram in each case.	7
	B	What is β – transition? Explain the relationship between T_g and T_m .	7
Q-V	A	What are the effect of additives on mechanical properties of polymers: Creep, stress relaxation and fatigue?	7
	B	Discuss Coefficient of linear thermal expansion and volumetric thermal expansion. Also define Pressure volume temperature.	7
Q-VI	A	Explain Heat capacity, specific heat and latent heat of crystallization and fusion.	7
	B	Explain effect of polymer structure on modulus of elasticity, flexural strength, fracture toughness.	7
Q-VII	A	What is the difference between adhesion and cohesion? Explain Cohesive energy and cohesive energy density.	7
	B	Explain the property differences in block copolymer and graft copolymer. Set some examples in brief.	7
Q-VIII	A	Explain stress – strain properties of polymers with reference to Hooke's Law: Tensile strength, Tensile modulus, yield strength and ultimate strength.	7
	B	Explain structural features of amorphous and crystalline polymers. What is degree of crystallinity?	7

SECTION – II

Q-IX	A	Branching in polymer enhances the density, because a) The regular structure of polymer b) The Irregular structure of polymer c) Density is independent of branching d) Branching does not enhance density	1
	B	Crystalline polymers are opaque because (pick the most appropriate one) a) Difference in crystal phases in the polymer structure b) Crystalline polymer absorbs more lights c) High frequency light can be pass through crystalline polymer d) None of these	1
	C	The flow ability of polymers (pick the most appropriate one) a) Long chain polymer are highly flowable b) Short chain polymers are highly flowable c) There is no relation of chain length and flow property d) None of these	1
	D	What is the polymer property above T_g a) Hard and brittle b) Soft and flexible c) There is no effect of T_g on the polymer properties d) None of these	1
	E	What is the effect of crystallinity on melting point? a) Melting point increases with crystallinity b) Melting point decreases with crystallinity c) There is no effect on crystallinity d) None of these	1
	F	The structure of polymer LLDPE a) Branched b) Linear c) Controlled branched d) None of these	1
	G	Polar polymers are a) Hygroscopic b) Water repellent c) There is no such relation d) None of these	1
	H	Which one is not true regarding polymer structure? a) Regular structures are potentially capable to crystallize b) Copolymerization increases the ability to crystallize c) Branching can reduce the ability to crystallize d) Each one of the above is correct.	1