0505E391

Candidate's Seat No :_____

M.Sc. (Sem.-II) Examination

408

CHEP : Molecular Motion in Polymers

May-2017

Time : 3 Hours] **[Max. Marks : 70**

Q-1-a	Explain the shear stress/ shear rate curve for various type of flow behaviour.	7
	OR	
Q-1-a	Explain the following: - Shear thickening, Shear thinning, Time dependent/independent fluid, intrinsic viscosity, Die swell, Homogeneous reaction, Rate constant.	7
Q-1-b	What is power law model? Explain in detail.	7
	OR	
Q-1-b	Derive Arrhenius equation. Give its proper significance.	7
Q-2-a	Discuss cone & plate viscometer & its importance in Rheological studies.	7
	OR	
Q-2-a	Discuss the correlation between Time Temperature Superposition with Boltzmann Principle	7
Q-2-b	Derive Power Law equation and its significance	7
	OR	
Q-2-b	Explain configuration & conformation? The rate constants of a certain reaction are 1.6×10^{-3} & 1.625×10^{-2} $(s)^{-1}$ at 40°C & 80°C. Calculate the activation energy	7
Q-3-a	What is viscoelasticity? Explain Kelvin-Vigot and Maxwell-Boltzmann model.	7
	OR	
Q-3-a	Derive WLF Equation?	7
Q-3-b	Discuss how crystanillity & Tg effect molecular orientation of polymer	7
	OR	
Q-3-b	At 500 k the rate of bimolecular reaction is ten times then the rate at 400 k. Find the activation energy for this reaction. (a) From Arrhenius equation. (b) From collision theory.	7
Q-4-a	What is Stress relaxation? Explain the significance of dimensionless number.	7
	OR	
Q-4-a	Explain zero shear viscosity in detail.	7
Q-4-b	What is the main role of Radius of Gyration in entanglement of chain in polymer?	7
	OR	
Q-4-b	Why Rheology is important and what type of role in molding technique	7
Q-5	Answer the following questions in short. 1. Explain how die swell and melt fracture effect in polymer melt flow. 2. What is Mooney viscosity? 3. What is the difference between grafting & crosslinking? 4. How do we measure rheological properties? 5. Dilute or semis dilute which forms more entanglement in polymer chains? 6. Name the factors affecting viscosity? 7. Give any two examples for pseudo Plastics, thixotropic and Bingham plastics.	14