Post Graduate Teaching Department of Chemistry

(An Autonomous Department)

Rashtrasant Tukadoji Maharaj Nagpur University, Nagpur

End Semester Examination Winter-2022

M.Sc. (Chemistry)- Physical Chemistry (3T3)

Semester – III (Elective Paper -Polymer Chemistry)

Time: - 3 Hours Maximum Marks: 60

Instructions: -

1) Solve either 'EITHER' part or 'OR' part.
2) Draw neat well labelled diagram wherever necessary.
3) All questions from are compulsory and carry equal marks

Q. 1	A)	Explain in brief about nomenclature and classification of polymer	4M
	B)	What is tacticity and write a note on classification based on stereo regularity.	4M
	C)	Discuss in brief about the cationic polymerization	4M
		OR	
	D)	What are polymer? Write the *IUPAC* name of i) Polyvinyl chloride (PVC) also write a note on PVC.	4M
	E)	Give an brief account on elastomer and natural polymers	4M
	F)	Discuss in brief about free radical polymerization along with their Mechanism	4M
Q. 2	A)	Draw a neat and labelled diagram of: i) Vapour pressure osmometern ii) Experimental method of light scattering method	4M
	B)	The intrinsic viscosity of a biopolymer is 217 cm3 gm-1. Calculate the concentration of biopolymer in water which contained relative viscosity of 1.5	
	C)	Define relative viscosity, and write their relationship between relative viscosity, and specific viscosity.	4M
		OR	
	D)	How do we determine the viscosity average molecular weight of polymer using Ostwald viscometer?	4M
	E)	In a given polymer sample 30% molecules have molecular mass 20,000, 40% have molecular masses 30,000 and the rest 30% have 60,000. Calculate M_n and M_w	4M

	F)	How do we determine the molecular weight by sedimentation and ultracentrifuge method	4M
Q.3	A)	What is glass transition temperature (Tg)? Discuss in brief about the factors affecting Tg and also explain their relations with Tt.	6M
	B)	Define the term crystallizabilty and explain the factors affecting on crystallizabilty	3M
	C)	Discuss any one method for the determination of Crystallinity of the polymer	3M
		OR	
	D)	Describe the Dynamic Mechanical Analysis (DMA) for determination of glass transition temperature of the polymer	6M
	E)	Discuss in detailed about the morphology of crystalline polymer.	3M
	F)	Explain why the process of crystallization never goes to completion in melting of polymer	3M
Q.4	A)	Discuss in brief about LDPE and HDPE	4M
	B)	Write an account for fire retarding polymers	4M
	C)	Discuss the synthesis and application of PANI	4M
		OR	
	D)	Write a note on biomedical PHA	4M
	E)	Write a note on epoxy-resin	4M
	F)	Discuss the synthesis and application of PMMA	4M
Q. 5	A)	Write a short note on linear and branched polymer	3M
	B)	If two polymers of molecular weight 10,000 and 1,00000 are mixed in equal parts by weight, calculate their weight average molecular weight	3M
	C)	Discuss in detailed about the crystal structure of polymers	3M
	D)	Write the application of conducting and biomedical polymers	3M

@ All the Best @
