1105E173

Candidate's Seat No : _____

MSc Sem.-3 Examination
502
Chemistry (Physical)

Time : 2-00 Hours]   **May 2022**   [Max. Marks : 50

Instructions: 1. All questions in Section-I carry equal marks.
2. Attempt any THREE questions in Section-I
3. Questions I is Section-II is compulsory.

Section-I:

Que.-1	(A)	Making use of the kinetic theory of gases derive an expression for the viscosity of a gas consisting of spherical molecule with fixed diameter.	07
	(B)	How molecular diameter and the Avogadro number can be calculated from the viscosity measurement of gases?	07
Que.-2	(A)	Write note on Graham's law of effusion and diffusion.	07
	(B)	Explain the terms mean free path, collision frequency and collision diameter. Show that the mean free path of a gas molecule increases by decrease in pressure,	07
Que.-3	(A)	Derive Bragg's law of X-ray diffraction.	07
	(B)	Explain the Laue method used to determine the structure of a molecule.	07
Que.-4	(A)	Explain how number of molecules in unit cell in a cubic crystal of NaCl calculated?	07
	(B)	Explain determination of lattice parameters of a unit cell of NaCl crystal.	07
Que.-5	(A)	How Beer's law is used for simultaneous determination of mixtures? What are the limitations of Beer's law?	07
	(B)	Explain Franck-Condon principle and its physical significance.	07
Que.-6	(A)	Explain how the Beer's law is used for to determine the pk_a value of an indicator.	
	(B)	Write note on selection rules of electronic transitions.	
Que.-7	(A)	Explain the laws of photochemistry	07

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	(B)	What do you understand by quantum yield? Explain high and low values of quantum yield by taking suitable example.	
Que.-8	(A)	Explain the experimental method for the determination of quantum yield.	07
	(B)	Write note on greenhouse effect and photochemical smog.	07
Que.-9		**Section-II: All the questions are compulsory**	08
	(i)	Why X-ray is useful for investigation of internal structure of a material?	
	(ii)	What are Kœ rays?	
	(iii)	What is photosensitization?	
	(iv)	What is the difference in fluorescence and phosphorescence in terms of wave length of emitted light?	
	(v)	Why most of all organic compounds are capable of absorbing electromagnetic radiation?	
	(vi)	What is the characteristic of molar absorptivity?	
	(vii)	How the rate of diffusion or effusion of a gas related with the molar mass of the gas?	
	(viii)	How the value of 'a' changes with compressibility factor Z?	

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