BIRLA INSTITUTE OF TECHNOLOGY, MESRA, RANCHI
(END SEMESTER EXAMINATION)

CLASS: MSc/IMSc **SEMESTER : I & VII**
BRANCH: CHEMISTRY **SESSION : MO/2024**

SUBJECT: CH402 CHEMICAL KINETICS & SURFACE CHEMISTRY

TIME: 3 Hours **FULL MARKS: 50**

INSTRUCTIONS:
1. The question paper contains 5 questions each of 10 marks and total 50 marks.
2. Attempt all questions.
3. The missing data, if any, may be assumed suitably.
***4*. Before attempting the question paper, be sure that you have got the correct question paper.**
5. Tables/Data hand book/Graph paper etc. to be supplied to the candidates in the examination hall.

			CO	BL
Q.1(a)	Discuss the assumptions involved in Conventional Transition state theory (CTST). Derive an expression for the rate constant within the premise of CTST.	[3+2]	2	2
Q.1(b)	Derive an expression for the rate constant of an unimolecular decomposition process utilizing RRK theory. Outline the assumptions involved therein.	[3+2]	2	2
Q.2(a)	Discuss the Debye-Huckel theory of interionic attraction.	[5]	2	2
Q.2(b)	Write down the final form of Debye-Huckel-Onsagar equation and explain the different terms involved in it. Draw the conductance vs concentration plot and mention the limitation of Debye-Huckel-Onsagar equation.	[5]	2	2
Q.3(a)	What is adsorption isotherm? Derive Langmuir adsorption isotherm and explain the behavior at low and high pressure.	[5]	4	2
Q.3(b)	Write down the equation for BET adsorption isotherm. How V_{mono} and constant 'C' can be determined?	[5]	4	2
Q.4(a)	Derive the rate law for the following radiation initiated reaction: $H_2 + Br_2 \rightarrow 2\ HBr$.	[5]	2	2
Q.4(b)	Utilizing the Jablonski diagram, discuss elementary processes that a molecule might undergo upon being exposed to external electromagnetic radiation.	[5]	2	2
Q.5(a)	What are surface active agents of surfactants? Discuss the principle of micelle formation. What is Critical Micelle Concentration (CMC)?	[5]	5	2
Q.5(b)	Compare between electrophoresis and electro-osmosis.	[5]	5	2

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