Total No. of Questions: 6 *Total No. of Printed Pages:3*

Enrollment No.....

Faculty of Science

End Sem (Even) Examination May-2022

CH5CO07 Physical Chemistry -II

Programme: M.Sc. Branch/Specialisation: Chemistry

Duration: 3 Hrs. **Maximum Marks: 60**

Note: All questions are compulsory. Internal choices, if any, are indicated. Answers of Q.1 (MCQs) should be written in full instead of only a, b, c or d.

Q.1 i. Which of the following is the correct Arrhenius equation? **1**

(a) $k = A\ e^{E_a}/RT$ (b) $k = A\ e^{E_a}/T$

(c) $k = A\ e^{E_a}/R$ (d) $k = A\ e^{-E_a}/RT$

ii. The catalytic efficiency of two distinct enzymes can be compared based on which of the following factor? **1**

(a) K_m (b) Product formation

(c) Size of the enzymes (d) pH of optimum value

iii. What does the Kelvin equation tell us about? **1**

(a) The liquid vapour pressure is less than normal

(b) The liquid vapour pressure is very less than normal

(c) The liquid vapour pressure is more than normal

(d) The liquid vapour pressure is equal to normal

iv. The concentration at which micelle formation occurs is termed: **1**

(a) Kraft point (b) Cloud point

(c) Isoelectric point (d) CMC

v. Which of the following is not an application of conducting polymers? **1**

(a) Rechargeable batteries (b) Analytical sensors

(c) Electronics (d) Adhesives

vi. The substance that is so effective, which can suppress the rate as well as degree of polymerization is a _____. **1**

(a) Retarder (b) Inhibitor (c) Promoter (d) None of these

P.T.O.

vii. Diffusion is the result of_____. **1**
(a) Random motion of particles
(b) Concentration gradient
(c) Kinetic energy of particles
(d) All of these

viii. If a liquid crystallises into solid, then entropy will: **1**
(a) Increases (b) Decreases (c) Zero (d) Remains same

ix. Which of the following electrochemical methods is/are used to determine the corrosion rate? **1**
(a) Tafel extrapolation (b) Linear polarization
(c) Both (a) and (b) (d) None of these

x. The diffusion current in the polarography does not depend on _____. **1**
(a) Capillary diameter (b) Lifetime of mercury drop
(c) Temperature (d) Charge of the electrolyte

Q.2 i. Write a note on kinetics of hydrogen-bromine chain reaction. **4**
ii. Describe collision theory of reaction rates in detail. **6**
OR iii. What are the fast reactions? How these reactions can be studied by flow method? **6**

Q.3 i. What is the surface active agents? Classify them. **4**
ii. Define CMC. Write the factors affecting the CMC of surfactants. **6**
OR iii. Define isotherm. Write a detail note on Gibbs adsorption isotherm. **6**

Q.4 i. A suspension of polymer contains an equal number of particles with molecular masses 20000 and 40000. Calculate the number average and weight average molecular mass of a given polymer. **4**
ii. Define Polymer. Write a detail note on the classification of polymers. **6**
OR iii. Describe the viscometry method for the determination of molecular mass of a polymer. **6**

Q.5 i. What is non–equilibrium thermodynamics? Write the significance of it. **4**
ii. Define the term forces and fluxes. Write a detail note on Onsager's reciprocity relations. **6**
OR iii. What is electro kinetic phenomena? Explain it with a suitable diagram. **6**

Q.6 i. What is Half wave potential? Write its significance. **4**
ii. Define overpotential. How it is determined by Tafel plot? **6**
OR iii. Write a detail note on Debye-Huckel-Onsager treatment. **6**

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Scheme of Marking

	Faculty of Science End Sem (Even) Examination June -2022 Physical Chemistry-II CH5CO07
	Programme: M.Sc. Chemistry | Branch/Specialisation:

Note: The Paper Setter should provide the answer wise splitting of the marks in the scheme below.

Q.1	i.	Which of the following is the correct Arrhenius equation? **d) $k = A\, e^{-E_a/RT}$**	1
	ii.	The catalytic efficiency of two distinct enzymes can be compared based on which of the following factor? **a) K_m**	1
	iii.	What does the Kelvin equation tell us about? **a) The liquid vapour pressure is less than normal**	1
	iv.	The concentration at which micelle formation occurs is termed **d) CMC**	1
	v.	Which of the following is not an application of conducting polymers? **d) Adhesives**	1
	vi.	The substance that is so effective, which can suppress the rate as well as degree of polymerization is a _____ **b) Inhibitor**	1
	vii.	Diffusion is the result of_____ **d) All of these**	1
	viii.	If a liquid crystallises into solid then entropy will b) decreases	1
	ix.	Which of the following electrochemical methods is/are used to determine the corrosion rate? **c) Both of these**	1
	x.	The diffusion current in the polarography does not depend on ..... **c) Temperature**	1
Q.2	i.	kinetics of hydrogen-bromine chain reaction. 4 marks	4
	ii.	collision theory of reaction rates - 6 marks	6
OR	iii.	fast reactions- 2 marks flow method – 4 marks	6
Q.3	i.	surface active agents- 2 marks Classification- 4 marks	4
	ii.	Define CMC- 2 marks factors affecting the CMC of surfactants.- 4 marks	6
OR	iii.	Isotherm- 2 Marks Gibbs adsorption isotherm- 4 marks	6
Q.4	i.	number average – 2 marks weight average molecular mass – 2 marks	4
	ii.	Define Polymer- 2 marks classification of polymers- 4 marks	6
OR	iii.	viscometry method for the determination of molecular mass of a polymer. – 6 marks	6
Q.5	i.	non –equilibrium thermodynamics- 2 marks Write the significance of it- 2 marks	4
	ii.	forces and fluxes- 2 marks Onsager's reciprocity relations. – 4 marks	6
OR	iii.	electro kinetic phenomena- 2 marks Explain it with a suitable diagrm.- 4 marks	6
Q.6	i.	Half wave potential- 2 marks Significance- 2 marks	4
	ii.	Overpotential- 2 marks Determination by Tafel plot- 4 marks	6
OR	iii.	Debye-Huckel-Onsager treatment – 6 marks	6

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