Raniganj Girls' College
Chemistry Department

Physical chemistry questions for sem IV (C-X)

1.

(a) What is S.I unit of surface excess ?
(b) Write down van't Hoff isochore with clearly stating terms involved therein.
(c) What is the dimension of polarisability ?
(d) Define gold number.
(e) What do you mean by critical micelle concentration?
(f) Represent glass electrode.
(g) Plot EMF of a cell vs temperature.
(h) Give example of a sparingly soluble salt,

2.

(a) What do you mean by electrolyte concentration cell? Give example.
(b) Draw the structures of micelle and reverse micelle with explanation.
(c) 'Adsorption is an exothermic process' – Justify or criticize.
(d) Explain how a catalyst increases the speed of a reaction.
(e) What do you mean by Le Chatelier principle?
(f) How is adsorption influenced by increase of pressure? Explain qualitatively.
(g) What do you mean by Debye –Falkenhagen effect?
(h) "Discuss on the origin of attractive forces between two Helium atoms when they approach each other.

3.

(a) How does orientation polarization of a polar molecule depend on temperature? How can it be used to determine the permanent dipole moment of the polar molecule?
(b) (i).Draw conductometric titration curve when an equimolar mixture of HCL & CH_3COOH is being titrated with NaOH solution. Also show the derivative plot. (ii) calculate $E^0$for the process $Cu^+ + e = Cu$, making use of the following E^0 values: $Cu^{+2} + e = Cu^+$ E_1^0 =0.159V, $Cu^{+2} + 2e = Cu$, E_2^0 =0.337V.
(c) Construct the cell required for the determination of pH of an acidic solution by quinhydrone electrode. Show how this cell potential is related to the pH of the solution.
(d) Write down the mechanism of an unimolecular gaseous reaction according to lindemann theory. Hence obtain the expression of rate (i) under low pressure & (ii) under high pressure conditions.

(e) (i) Equivalent conductance increases while the specific conductance decreases with

decrease in concentration of electrolyte -Explain. (ii) A conductivity cell was filled with 0.05moldm^{-3} NaOH and the resistance was 40 ohm. If the cell constant is 0.4cm^{-1}, find out the molar conductivity of NaOH at that concentrations.

4.

(a) Why 'limiting' is used in Debye –Huckel limiting law. (ii) Write short notes on Asymmetric effect and Electrophoretic effect.
(iii) Discuss the effect of temperature and dielectric constant of the medium on the thickness of the ion atmosphere.

(b) (i) Establish the Langmuir adsorption isotherm with clearly stating the assumption involved.
(ii) Consider the adsorption of diatomic gas on solid surface. Show that the fraction of surface covered has the expression where and is the equilibrium pressure of thegas. Discuss the case
when pressure is very low and very high. (iii) Explain the stability of colloids in
terms of zeta potential.

(c) (i) Describe Kohlrausch's law of independent migration of ions. (ii) Suggest a suitable linear plot to show the variation of equilibrium constant of an exothermic reaction with temperature at constant pressure. In this connection, derive the necessary equation starting from Van't Hoff reaction isotherm.
(iii) How will you determine solubility product of a sparingly soluble salt by conductance measurement?