

T.Y.B.SC. SEM – V (2014 Course) : SUMMER - 2019

SUBJECT : PHYSICAL CHEMISTRY – V

Day : Monday
Date : 08/04/2019

S-2019-0994

Time : 12.00 NOON TO 02.00 PM
Max. Marks : 40

N.B.

- 1) All questions are **COMPULSORY**.
- 2) Figures to the right indicate **FULL** marks.
- 3) Answers to both the sections should be written in **SAME** answer book.
- 4) Use of non-programmable calculator/log table is allowed.

SECTION – I

- Q.1** Attempt any **TWO** of the following: (10)
- a) Explain reversible and irreversible cells.
 - b) State and explain Beer's law.
 - c) How equilibrium constant is determined from emf measurement?
- Q.2** Attempt any **TWO** of the following: (10)
- a) What is adsorption? Derive Langmuir adsorption isotherm.
 - b) What is Heisenberg's uncertainty principle? How it explains the concept of probability?
 - c) Explain amalgam electrode with reference to its representation, electrode reaction and emf equation.

SECTION – II

- Q.3** Attempt any **TWO** of the following: (10)
- a) Derive an expression for emf of an electrode concentration cell without transference.
 - b) Explain how emf measurements may be employed to determine thermodynamic parameters ΔG , ΔH and ΔS .
 - c) Write a precise note on "Determination of surface area of adsorbents."
- Q.4** Solve any **TWO** of the following: (10)
- a) Calculate the potential of cell at 298 K
 $\text{Zn}_{(s)} | \text{ZnCl}_2, a = 0.0072 | \text{AgCl}_{(s)} | \text{Ag}$
Given : $E_{\text{Zn}}^0 = -0.761 \text{ V}$ and $E_{\text{Ag} - \text{AgCl}}^0 = 0.222 \text{ V}$
 - b) A solution of KMnO_4 shows 0.8 absorbance at wave length 540 nm. Express the measurement in terms of transmittance unit.
 - c) Calculate the emf of the chemical cell without transference,
 $\text{Pt} | \text{H}_2(\text{g}, 1 \text{ atm}) | \text{HCl} (a = 0.1) | \text{Hg}_2\text{Cl}_2(\text{s}) | \text{Hg}_{(l)} | \text{Pt}$,
Standard potential of calomel electrode is 0.268 V at 298 K.

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