

BACHELOR OF SCIENCE (CBCS-2018 COURSE)
T. Y. B. Sc. Sem-V : WINTER :- 2021
SUBJECT: CHEMISTRY : PHYSICAL CHEMISTRY-I

Day : Wednesday
Date 19-01-2022

W-18414-2021

Time : 02:00 PM-05:00 PM
Max. Marks: 60

N.B.

- 1) All questions are **COMPULSORY**.
 - 2) Figures to the **RIGHT** indicate **FULL** marks.
 - 3) Use of log table / scientific **CALCULATOR** is allowed.
 - 4) Draw neat diagrams **WHEREVER** necessary.
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Q.1 Attempt **ANY TWO** of the following : (12)

- a) State and prove Lambert's law.
- b) Give details of BET theory for multilayer adsorption.
- c) What are the conventions used to represent a cell?

Q.2 Attempt **ANY TWO** of the following : (12)

- a) How surface area of adsorbent is determined using BET equation?
- b) What do you understand by reversible and irreversible cells?
- c) Define the terms optical density, opacity and transmittance.

Q.3 Attempt **ANY TWO** of the following : (12)

- a) Give definitions of adsorbate and adsorbent. Elaborate on Freundlich adsorption isotherm.
- b) Compare simple colorimeter and photoelectric colorimeter.
- c) Distinguish between physical and chemical adsorptions.

Q.4 Attempt **ANY THREE** of the following : (12)

- a) Show that $A = 2 - \log \% T$.
- b) Determine the electrode potential of the following electrode at 298 K.
 $H^+(a=0.1) | H_2(g, 1bar) | Pt, E^0_{H_2} = 0.00 V$.
- c) Calculate the potential of the cell at 298 K.
 $Zn_{(s)} | ZnCl_2(a=0.0072) | AgCl_{(s)} | Ag$
Given : $E^0_{Zn} = -0.761 V$ and $E^0_{Ag-AgCl} = 0.222 V$.
- d) The molar absorptivity of a particular solute is 2.1×10^4 . Calculate the transmittance through a cuvette with path of 5 cm for a $2.0 \times 10^{-6} M$ solution.

Q.5 Attempt **ANY FOUR** of the following : (12)

- a) What is electrochemistry? How electrolytic cell differs from voltaic cell?
- b) Throw light on Compton effect.
- c) Discuss construction of Daniel cell.
- d) Interpret the equation $-\Delta G = W_{max}$.
- e) Discuss the wave particle duality.
- f) List the applications of quantum theory.
