

B.Sc. Semester - 6 (CBCS) Examination

April/May-2022 (OLD COURSE)

PHYSICAL AND ANALYTICAL CHEMISTRY(CORE)

Time: 2:30 Hours

Marks: 70

Instructions:

1. All questions are compulsory.
2. Figures to the right indicate marks.

Q. 1 (a) Answer the following question. (4)

- (1) Calculate μ of solution prepared by dissolving 20 gm of NaOH in 3 Kg of water at 25 °C.

Q. 1 (b) Answer any two questions out of three. (10)

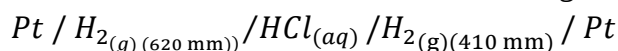
- (1) Explain in detail: Nernst heat theorem.
- (2) Discuss the emf method for the determination of activity co-efficient.
- (3) (i) Explain the graph of $-\log f_{\pm} \rightarrow \sqrt{\mu}$.
(ii) Write a note on residual entropy.

Q. 2 (a) Answer the following question. (4)

- (1) Explain: How to determine the dissociation constant (K_a) of weak acid using emf measurement?

Q. 2 (b) Answer any two questions out of three. (10)

- (1) Derive the equation of emf for electrolyte concentration cell with transference.
- (2) Explain methods of elimination of Liquid Junction Potential in detail.
- (3) Write the cell reactions and calculate emf of following cell at 298 K.



Q. 3 (a) Answer the following question. (4)

- (1) Derive Nernst distribution law using chemical Potential.

Q. 3 (b) Answer any two questions out of three. (10)

- (1) Write a note on Student T-test.
- (2) The amount of element A in AB compound in different experiments obtained as 42.40 %, 42.44%, 42.29%, 42.28% and 42.46%. Then, calculate *Median value, Mean Value, Average deviation, Relative average deviation*.
- (3) (i) Discuss: Physical significance of chemical potential.
(ii) Write a short note on indeterminate errors.

Q. 4 (a) Answer the following question. (4)

- (1) Write a note on Circular paper chromatography.

Q. 4 (b) Answer any two questions out of three. (10)

- (1) Explain working method of Column Chromatography.
- (2) Write principle of Ion-exchange chromatography and explain factors affecting on the ion-exchange phenomena.
- (3) (i) Write a note on the selection of Carrier gas in gas chromatography.
(ii) Write any six applications of TLC.

Q. 5 (a) Answer the following question. (4)

- (1) Discuss in detail: Charcoal cavity Test with principle.

Q. 5 (b) Answer any two questions out of three. (10)

- (1) Explain: Separation of mixture of NO_3^- , NO_2^- and Br^- ions in detail.
- (2) Explain: argentometric titration of mixture of Cl^- , Br^- and I^- by $AgNO_3$ potentiometrically.
- (3) Explain the redox titration of $FeSO_4$ against $KMnO_4$, potentiometrically.
