15/12/23

DOON UNIVERSITY, DEHRADUN
Mid Semester Examination, December, 2023
School of Physical Sciences, Department of Chemistry
NEP Chemistry, I[st] Semester
Course: CYC–103: Molecules in Motion & Ionic Equilibria

Time Allowed: 2 Hours. ***Maximum Marks: 30***

Note: Attempt All Questions

SECTION: A

Attempt All Questions.

(Marks: 6Q × 1= 6)

1. How do impurities or additives influence the structure of a liquid?
2. What is the qualitative treatment of the structure of the liquid state?
3. Define buffer and buffer range.
4. Write the Henderson – Hasselbach ~~Hsselbalch~~ equation and explain its physical significance.
5. What is ionic product of water. Does it depend on temperature?
6. Cite an example of capillary action.

SECTION: B

Attempt All Questions. ***(Marks: 6Q × 2= 12)***

7. Explain any one of the applications of surfactants in industry or household.
8. How would you determine the viscosity of an unknown liquid?
9. Derive an expression for degree of hydrolysis of an acid.
10. What are the factors effecting degree of ionization of an electrolyte?
11. Derive an equation to determine pH of hydrolyzed salt solution.
12. Explain mechanism of buffer action.

SECTION: C

Attempt All Questions.

(Marks: 3Q × 4= 12)

13. Discuss significance of bicarbonate buffer system in biological systems.
14. Calculate the pH of a solution made by adding 0.001 mole of NaOH to 100 cc of a solution which is 0.05 M in acetic acid and 0.05 M in sodium acetate.
15. Calculate the value of K_h, α_h and pH for the following solutions:
    a) 0.1M ammonium acetate ; $K_a=K_b=1.8x10^{-5}$ M
    b) 0.1 M anilinium acetate; $K_a=1.8x10^{-5}$ M and $K_b=4.6x10^{-10}$ M