K26FY0422 Pages: 2 Reg No:.....
Name:.....

Fourth Semester FYUGP Degree (Reg) Examination April 2026

KU4DSCCHE203 - PHYSICAL CHEMISTRY-I

2024 Admission onwards

Time : 1.5 hours Maximum Marks : 50

Section A

Answer any 6 questions. Each carry 2 marks.

1. What is meant by vapour pressure of a liquid?
2. How does temperature affect surface tension?
3. Define collision diameter and collision frequency
4. Write the kinetic gas equation and indicate the terms.
5. How is elevation in boiling point related to molecular mass of a solute?
6. What is meant by degree of dissociation? Give the relation between Van't Hoff factor and degree of dissociation
7. Calculate the pH and pOH of 0.04 M HNO3.
8. Mention two industrial applications of buffer solutions.

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Section B

Answer any 4 questions. Each carry 6 marks.

9. Explain the deviation of real solutions from ideal behaviour.
10. Define the term 'azeotropic mixture with maximum boiling point' Describe the fractional distillation of this system with distillation diagram
11. At 37°C, the osmotic pressure of blood is 7.65 atm. How much glucose $\left(M = 180\,\mathrm{g\,mol^{-1}}\right)$ should be used per litre for an intravenous injection to have the same osmotic pressure as blood?
12. Explain why the heat of neutralization of strong acid and strong base is nearly constant.
13. What are acid–base indicators? Explain the Ostwald theory of acid–base indicators.
14. Derive the Henderson–Hasselbalch equation for an acidic buffer and explain its significance.

Section C

Answer any 1 questions. Each carry 14 marks.

15. a)Explain the different physical properties of liquids.
    b)Describe the principle, construction and working of Abbe's refractometer.

16. a) Define degrees of freedom. Illustrate the degrees of freedom for monoatomic, diatomic, and polyatomic molecules.
    b) Give the degrees of freedom for benzene and acetylene.
    c) Calculate the molar heat capacities Cp and Cv for carbon dioxide.

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