

# PRABHAT KUMAR COLLEGE, CONTAI

SEM – IV

Physical Chemistry CC-8

Group – A

*Answer any one*

1. Starting the assumptions and approximations involved, derive thermodynamically a relation between elevation of boiling point of a solution and the molal concentration of a non-volatile solute.
2. Derive thermodynamically, starting the necessary assumption and approximations, a relation between the depression of freezing point of a solution and concentration of the solute.
3. Draw and explain briefly the phase diagram for H<sub>2</sub>O system.
4. What do mean by Debye-Huckel limiting law? Why is Debye-Huckel theory of dilute ionic solution known as Debye-Huckel Limiting law?
5. Prove  
$$[\hat{L}_x, \hat{L}_y] = i\hbar\hat{L}_z$$
6. Calculate the standard half cell potential of the half cell Fe<sup>3+</sup>/Fe<sup>2+</sup>.  
Given  $E_{Fe^{3+}/Fe}^0 = -0.036V$        $E_{Fe^{2+}/Fe}^0 = -0.440$

Group – B

*Answer any one*

7. Write the theory only of “Potentiometric titration of Mohr’s salt solution against standard K<sub>2</sub>Cr<sub>2</sub>O<sub>7</sub> solution”.
8. Write the theory only of “Study of phenol-water diagram”.
9. Discuss only theory of “pH-metric titration of HCl against NaOH”.

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