Gurudas College

BSc Semester IV Internal examination, 2020

Chemistry (Honors)

Paper CC-4-9 (Physical)

Time-2hrs **F.M.=50**

Group A(Theory)

Answer any five questions: (5x5=25)

1) Calculate the number of components and degrees of freedom for the following equilibrium: An aqueous solution of NaCl.
2) Write down Clausius-Clapeyron equation clearly mentioning the meaning of different terms involved in it.
3) Write down the mathematical form of cryoscopic constant, mentioning the different terms involved in it.
4) Define osmotic pressure and write down its mathematical form mentioning the terms involved in it.
5) What is 'Compton effect'? Use a properly labelled diagram to illustrate your answer.
6) Find the most likely location of a particle in a one-dimension box of length 'L' in the ground state.
7) Tantalum forms a body-centered unit cell with a=330.2 pm. Calculate the crystallographic radius of tantalum atom.
8) KCl has an fcc lattice, but from X-Ray diffraction experiment it appears to be simple cubic. Explain.

Group B (Practical)

Answer any three questions (5x3=15)

1) Name the different parts of a polarimeter.
2) Define upper-critical solution temperature in a temperature-composition diagram of a partially miscible liquid pair.
3) Write down the name of one partially miscible liquid pair other than Phenol-water system.What is the value of upper-CST of Phenol-water system and the corresponding composition of Phenol?

4) Write down the limitation of Nernst's distribution law.
5) By using pH-metric titration curve of the reaction between Oxalic acid and NaOH solution, how can you determine pK_2 of Oxalic acid.
6) For an acid-base indicator, indicate the suitable range where color-matching test can be performed to determine pH of the unknown buffer.

Group C(Internal Assessment)

Answer any two questions: (2x5=10)

1) What are the criteria of phase-equilibrium?
2) What is colligative property? Name the different colligative properties of a dilute solution.
3) Find the simplest formula of a solid containing A and B atoms in a cubic arrangement in which A occupies corners and B the center of the faces of the unit cell.
4) Determine whether the following functions are acceptable over the indicated intervals: e^x $(-\infty, 0)$, $\tan\theta$ $(0, \pi/2)$.