

BIRLA INSTITUTE OF TECHNOLOGY, MESRA, RANCHI
(END SEMESTER EXAMINATION)

CLASS: IMSC
BRANCH: CHEMISTRY

SEMESTER : V
SESSION : MO/2023

SUBJECT: CH326 PHYSICAL CHEMISTRY-V

TIME: 3 HOURS

FULL MARKS: 50

INSTRUCTIONS:

1. The question paper contains 5 questions each of 10 marks and total 50 marks.
 2. Attempt all questions.
 3. The missing data, if any, may be assumed suitably.
 4. Before attempting the question paper, be sure that you have got the correct question paper.
 5. Tables/Data hand book/Graph paper etc. to be supplied to the candidates in the examination hall.
-

			CO	BL
Q.1(a)	Elaborate incongruent melting in a binary reacting system.	[5]	1	2
Q.1(b)	Explain the phase diagram of a ternary system.	[5]	1	2
Q.2(a)	Derive Gibbs-Duhem and Duhem-Margules equations.	[5]	2	2
Q.2(b)	Apply phase rule in explaining the distillation of a partially miscible liquid pair.	[5]	2	2
Q.3(a)	Derive Van't Hoff equation for osmotic pressure of a dilute solution. How is this equation utilized for determining the molar mass of a solute?	[5]	3	2
Q.3(b)	A solution of 10 gm of NaCl in 1 kg of water freezes at -0.604°C . Calculate the degree of dissociation of NaCl in water. $K_f = 1.85 \text{ K kg mol}^{-1}$.	[5]	3	3
Q.4(a)	What is the common ion effect? How does the common ion effect influence solubility and solubility product of AgCl?	[5]	4	2
Q.4(b)	What is a buffer solution? Derive the Henderson equation for determination of pH of an acidic buffer.	[5]	4	2
Q.5(a)	What are the sources of electric dipole moment in a molecule? How is it connected to the dielectric constant.	[5]	5	3
Q.5(b)	Discuss noncovalent interactions.	[5]	5	2

:::23/11/2023 M:::