Reg. No.										

MANIPAL INSTITUTE OF TECHNOLOGY

MANIPAL

A Constituent Institution of Manipal University

VI SEMESTER B.TECH. MAKE UP EXAMINATIONS, JULY 2022

SUBJECT: FUNDAMENTALS OF INDUSTRIAL CATALYTIC PROCESS [CHM 4302]

REVISED CREDIT SYSTEM

Time: 3 Hours 18.7.22 MAX. MARKS: 50

Instructions to Candidates:

- Answer **ALL** the questions.
- Missing data may be suitably assumed.

1A.	(i) State and derive Raoult's law for vapour pressure lowering. How is it used for determining the molar mass of a non- volatile compound? (ii)Calculate the mass of the solute of molar mass 342 g mol^{-1} that should be dissolved in 150 gram of water to reduce its vapour pressure to 22.8 torr. The vapour pressure of pure water at 25° C = 23.75 torr	**5**
1B.	(i) Define the terms osmotic pressure and isotonic solutions. (ii) At 36 ° C, the osmotic pressure of blood is 7.55 atm. How much glucose(M= 180 g mol^{-1})Should be used per litre for an intravenous injection that is to have the same osmotic pressure as blood	**3**
1C.	Find the molal boiling point elevation constant of water which evaporates at 373 K with the absorption of 40670 J per mole.(R = 8.313 J K^{-1} mol^{-1})	**2**
2A.	What are lyophobic and lyophilic sols? Explain the following properties of sols (i) Tyndal effect (ii) electrical	**5**
2B.	Define Gold number. Write note on Hardy –Schulze law	**3**
2C.	Give reason: (i) Sols pass readily through ordinary filter papers. (ii) Colloidal particles exhibit zig –zag movement.	**2**
3A.	Discuss the following binary systems of partially miscible liquids: i) Phenol water (ii) Trimethylamine-water (iii) Nicotine-water	**5**
3B.	Acetic acid associates in benzene to form double molecules. 1.65 g of acetic acid when dissolved in 100 g of benzene raised the boiling point by 0.36 ° C. Calculate the vant Hoff factor and the degree of dissociation of acetic acid in benzene.	**3**
3C.	A solution containing 2.44 g of a solute dissolved in 75 g of water boiled at 100.413 ° C . Calculate the molar mass of the solute . (K_b for water = 0.52 K kg mol^{-1})	**2**
4A.	Write and describe individual steps involved in the Haber's process	**5**
4B.	Explain the factors which influence adsorption of a gas on a solid	**3**
4C.	How does chemisorption differ from physisorption?	**2**
5A.	Discuss briefly Langmuir's unimolecular theory of adsorption. Derive an expression for Langmuir's adsorption isotherm.	**5**
5B.	Sketch the different type of adsorption isotherms. Give suitable example for each.	**3**
5C.	Write the factors on which adsorption depends.	**2**

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