MANIPAL INSTITUTE OF TECHNOLOGY

MANIPAL

(A constituent unit of MAHE, Manipal)

VI SEMESTER B.TECH. INTERNAL EXAMINATIONS MAY - 2021

INSEMESTER EXAMINATION (online)

SUBJECT: FUNDAMENTALS OF INDUSTRIAL CATALYTIC PROCESS

[CHM **4302**]

Date of Exam:22/05/2021 **Time: 120 +15 min.** **Max. Marks: 30**

Instructions to Candidates:

- Answer ALL the questions & missing data may be suitably assumed.

1.	State Henry's law. Under what condition Henry's law hold good for real gases. Mention any one application of Henry's law.	**2**
2.	Give reasons for the following: a) Brownian movement is not observed in ordinary suspensions. b) Addition of surface active agents results in stable emulsion.	**2**
3.	a) Explain how the degree of dissociation of KCl may be determined from the measurement of a colligative property. b) Calculate the osmotic pressure of a solution (density = 1.02g cm^{-3}) containing 50 g glucose($C_6H_{12}O_6$) in 1 kg of water at 300 K.	**2**
4.	Distinguish between the following: (any two points) a) Elastic and non-elastic gels. b) Ideal and non-ideal solutions.	**2**
5.	State whether the following statements are true or false. Comment on the correct version. a) Large quantities of electrolytes cause precipitation of lyophobic sols. b) In ultrafiltration, the removal of the electrolyte is achieved by causing the constituent ions to migrate out of the membrane.	**3**
6.	Show that depression in freezing point is a colligative property. Mention any one application of this property.	**3**
7.	a) Show that $\Delta V_{mix} = 0$ b) Give an account of preparation of silicic acid gel by double decomposition method.	**2+1**

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8.	a) Discuss a method for determining the size and mass of the colloidal particles. b) A solution containing 0.5 g of a solute (molar mass 130 $gmol^{-1}$) in 50 g CCl_4 yield a boiling point elevation of 0.4K. While a solution of 0.6 g of an unknown solute in the same mass of solvent yields 0.6K of elevation of boiling point. Calculate the molar mass of the solute.	**3+1**
9.	a) Explain Landsberger's method for the determination of molecular weight of a non-volatile solute. b)Calculate the volume required to prepare 2 L of 3 M H_2SO_4 solution from 96% H_2SO_4 solution (density = 1.83 gmL^{-1})	**3+1**
10.	a) Define the upper and the lower consolute temperatures. Explain a system which has both upper and lower consolute temperature with a suitable example. b) A current of dry air was passed through a solution of 4.5 g of solute in 100 g of water and then through pure water. The loss in weight of solution was 2.25g and that of pure water was 0.1 g. Calculate the molecular weight of solute. c) A mixture of water and organic liquid distill at 95° C and the distillate contains 1.6 times as much as organic liquid as water by mass. At 95° C the vapour pressure of water and organic liquid are 640 mm Hg and 120 mmHg respectively. Calculate the molecular weight of organic liquid.	**2** **1.5** **1.5**