

- Q.24 Discuss in brief about two film theory of mass transfer.

Q.25 Describe the working of spray chambers.

Q.26 Explain the working of tray dryers with neat diagram.

Q.27 Describe humidity chart. Write any one use of humidity chart.

Q.28 Enlist the points to be remember while choosing a solvent for absorption.

Q.29 Define humid heat, humid volume and dew point.

Q.30 Write the use of tower packing with their types and properties.

Q.31 Explain in brief about rate of drying curve with its neat diagram.

Q.32 Explain Raoult's law and Henry's law.

Q.33 Differentiate between bound and unbound moisture content.

Q.34 Write any four applications of drying operation.

Q.35 Discuss any one of the following

 - (i) Overall mass transfer coefficient
 - (ii) Film mass transfer coefficient

Section-D

Note: Long answer questions. Attempt any two question out of three Questions. (2x10=20)

- Q.36 Explain in detail about the different types of problems encountered in packed towers.

Q.37 What do you mean by drying? Explain construction and working of rotary dryer with the help of neat diagram.

Q.38 What is the working principle of cooling towers? Describe the different cooling tower arrangement with neat diagrams

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4th Sem. Branch: Chemical Engineering, P & P

Sub : Mass Transfer-I

Time : 3 Hrs.

M.M. : 100

SECTION-A

Note: Multiple choice Questions. All Questions are compulsory. (10x1=10)

- Q.1 Diffusion means

 - a) Accumulation of particles on solid surface
 - b) Movement of particles through semi permeable membrane
 - c) Movement of particles from high concentration to low concentration
 - d) None of these

Q.2 The mutual solubility of two liquids

 - a) Decrease with increase in temperature
 - b) Increase with increase in temperature
 - c) Remain constant
 - d) None of the above

Q.3 Which theory explains mass transfer across a thin stagnant film?

 - a) Penetration theory
 - b) Film theory
 - c) Surface renewal theory
 - d) None of these

- Q.4 What type of packing is used in absorption towers to enhance contact surface area?
- Raschig rings
 - Spray nozzles
 - Bubble caps
 - Tray columns
- Q.5 What is the moisture content of a material on a dry basis?
- The weight of moisture per unit weight of dry solid
 - The weight of moisture per unit weight of wet solid
 - The total weight of moisture
 - The percentage of moisture by volume
- Q.6 What does the drying rate curve indicate?
- The relationship between temperature and time
 - The relationship between drying rate and moisture content
 - The relationship between air flow and drying time
 - The relationship between pressure and drying time
- Q.7 What is the term for the moisture that remains in a solid after drying to equilibrium under a given set of conditions?
- Free moisture content
 - Bound moisture content
 - Critical moisture content
 - Equilibrium moisture content
- Q.8 What is the definition of unbound moisture content?
- Moisture content in equilibrium with the surrounding air
 - Moisture that is not chemically bonded to the material
 - Moisture that cannot be removed by drying
 - Moisture that is free to evaporate

- Q.9 During which period of drying does the rate of drying remain constant?
- Falling rate period
 - Constant rate period
 - Initial rate period
 - Final rate period
- Q.10 What is the term for the height of a column based on the overall mass transfer coefficient?
- HTU
 - NTU
 - HETP
 - None

Section-B

Note: Objective type questions. All questions are compulsory. **(10x1=10)**

- Q.11 Define Fick's law of diffusion.
- Q.12 What do you mean by mass transfer.
- Q.13 Define diffusion.
- Q.14 Expand NTU.
- Q.15 What are the units of humidity?
- Q.16 Write the formula of Henry's law.
- Q.17 What do you understand by equilibrium.
- Q.18 Name any two mass transfer theories.
- Q.19 Define desorption.
- Q.20 Define wet bulb temperature.

Section-C

- Note:** Short answer type Question. Attempt any twelve questions out of fifteen Questions. **(12x5=60)**
- Q.21 What are mass transfer operations? Write in brief about any two operations.
- Q.22 What is diffusion in mass transfer? Explain eddy diffusion.
- Q.23 Drive the equation for steady state gas phase equimolecular counter diffusion.