

- Q.26 Explain gas desorption mass transfer operation with the help of suitable examples?
- Q.27 Discuss the concept of wet bulb temperature in brief?
- Q.28 Define the term humidity. Discuss two different ways to express humidity?
- Q.29 Describe the working of tray drier?
- Q.30 Describe the construction of spray ponds in brief?
- Q.31 What is difference between batch drier and continuous drier?
- Q.32 Explain the different factors affecting the selection of a solvent for gas absorption mass transfer operations?
- Q.33 Define and discuss drying mass transfer operation in brief?
- Q.34 Discuss construction of cooling tower in brief?
- Q.35 What is difference between free moisture and equilibrium moisture?

SECTION-D

Note: Long Answer type question. Attempt any two questions. (2x10=20)

- Q.36 Describe the classification of mass transfer operations, on the basis of direct contact of two immiscible phase, in detail with the help of one example for each type?
- Q.37 Describe the packed tower used in chemical industry in detail with the help of neat diagram?
- Q.38 Discuss the construction and working of rotary drier in detail with the help of neat diagram?

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**4th Sem / Chemn. & P&P
Subject : Mass Transfer I**

Time : 3 Hrs.

M.M. : 100

SECTION-A

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

- Q.1 Mass transfer operations are used for which of the following purpose?
- Purification of raw materials
 - Manufacture of Products
 - Bleaching of Pulp
 - Chemical modification of material
- Q.2 Mass transfer co-efficient (k) and diffusivity (D) are related according to film theory as?
- $k \propto D$
 - $k \propto D^{1/2}$
 - $k \propto D^{3/2}$
 - $k \propto D^2$
- Q.3 What should be done for adsorbing a sparingly soluble gas in a liquid?
- Gas side coefficient be increased
 - Liquid side coefficient be increased.
 - Gas side coefficient be decreased
 - Liquid side coefficient be decreased
- Q.4 Channeling is most severe in which type of towers?
- Without packing
 - With dumped packing of regular units
 - With stacked packing
 - Randomly packed with crushed solids

- Q.5 When both the fluids flow concurrently in an absorbed, the slope of the operating
- 1
 - Uncertain
 - Positive
 - Negative
- Q.6 Fick's law is valid for?
- Solids
 - Liquids
 - Gases
 - All of the above
- Q.7 Humidification involves mass transfer between a pure liquid phase and a fixed gas which is?
- Soluble in the liquid
 - Insoluble in the liquid
 - Non-Ideal in nature
 - Ideal in nature
- Q.8 Raoult's law is applicable to?
- Ideal solutions
 - Real solutions
 - Mixture of water and alcohol
 - All of the above
- Q.9 Heat is BTU necessary to increase the temperature of 1 lb of gas and its accompanying vapour by 1°F is called?
- Latent heat
 - Humid heat
 - Specific heat
 - Sensible heat
- Q.10 All moisture in a non-hygroscopic material is?
- Bound moisture
 - Free moisture
 - Unbound moisture
 - Equilibrium moisture

SECTION-B

- Note:** Objective type questions. All questions are compulsory. $(10 \times 1 = 10)$
- Q.11 Name the phase contact category of humidification mass transfer operation?

- Q.12 Write full form of HETP?
- Q.13 Write an expression to calculate molecular diffusion in gases for steady state equimolar counter diffusion.
- Q.14 Define mass transfer coefficient?
- Q.15 Name the type of solution in which intermolecular forces of attraction and repulsion in solution remain unchanged on mixing the constituents?
- Q.16 State Henry's Law?
- Q.17 Write any two factors which affects the rate of mass transfer operations?
- Q.18 How moisture content on dry basis is expressed?
- Q.19 The liquid fill the entire space between the trays during operation of tray towers. Name the term which is used to describe this problem.
- Q.20 What is name given to the chart which depicts variation in absolute humidity, enthalpies and humid volume versus temperature for air-water mixture?

SECTION-C

- Note:** Short answer type questions. Attempt any twelve questions out of fifteen questions. $(12 \times 5 = 60)$
- Q.21 Discuss any one type of mass transfer operation in brief?
- Q.22 What are uses of humidity chart?
- Q.23 Explain the diffusion under concentration gradient with the help suitable example?
- Q.24 Explain the molecular diffusion in the gases involving steady state equimolar counter diffusion with the help of suitable example?
- Q.25 Discuss the characteristic of tower packing which are to be considered while its selection for particular application?