Question Bank for Mass Transfer - II

Chapter 1: Humidification and Dehumidification	
1.	Define wet bulb and dry bulb temperatures and explain their significance in humidification processes. (L1 – Remember, CO1)
2.	Explain the principle of wet bulb temperature theory with examples. (L2 – Understand, CO1)
3	Differentiate between absolute humidity and relative humidity with calculations. (L3 – Apply, CO1)
4	Describe the construction and working of natural and mechanical draft cooling towers with diagrams. (L2 – Understand, CO2)
5	Analyze the performance of a cooling tower based on given data. (L4 – Analyze, CO4)
6.	Solve a numerical problem to determine the water loss due to evaporation in a cooling tower. (L4 – Analyze, CO4)
6	Using a psychrometric chart, calculate the specific humidity and enthalpy of air at a given condition. (L3 – Apply, CO5)
7	Explain the methods of humidification and dehumidification and their industrial applications. (L2 – Understand, CO2)
8	Derive the equation for heat and mass transfer in a cooling tower. (L3 – Apply, CO4)
9	Define wet bulb and dry bulb temperatures and explain their significance in humidification processes. (L1 – Remember, CO1)
Chapter 2: Drying	
1.	Define drying and classify the types of moisture present in solids. *(L1 – Remember, CO1)*
2.	Explain the constant rate and falling rate periods of drying with a drying rate curve. *(L2 – Understand, CO2)*
3.	Differentiate between free moisture and bound moisture with examples. *(L3 – Apply, CO2)*
4.	Describe the construction and working principle of a rotary dryer and fluidized bed dryer. *(L2 – Understand, CO3)*
5.	Explain the mechanism of drying in a spray dryer and its application in food industries. *(L2 – Understand, CO2)*
6.	Solve a problem to calculate the drying time for a batch process given the initial and final moisture content. *(L4 – Analyze, CO4)*
7.	Perform an energy balance calculation for a tray dryer to determine the heat requirement. *(L4 – Analyze, CO4)*
8	Compare the working principles of tunnel dryer and flash dryer with examples. *(L3 – Apply, CO2)*
9	Explain the choice of dryer for heat-sensitive materials with industrial examples. *(L2 – Understand, CO3)*
Chapter 3: Extraction	

1.	Define liquid-liquid extraction and explain its significance in chemical engineering. *(L1 – Remember, CO1)*
2.	Explain the principle of solid-liquid extraction with examples. *(L2 – Understand, CO1)*
3.	Differentiate between batch and continuous extraction methods with industrial applications. *(L3 – Apply, CO2)*
4.	Describe the construction and working of a mixer-settler used in liquid-liquid extraction. *(L2 – Understand, CO3)*
5.	Solve a numerical problem to determine the solvent-to-feed ratio in a liquid-liquid extraction process. *(L4 – Analyze, CO4)*
6	Explain the parameters affecting the choice of solvent in liquid-liquid extraction. *(L2 – Understand, CO2)*
7	Derive the material balance equation for a counter-current solid-liquid extraction system. *(L3 – Apply, CO4)*
8	Perform a calculation to determine the extraction efficiency for a given system using equilibrium data. *(L4 – Analyze, CO5)*
9	Describe the design and working of a continuous rotary extractor. *(L2 – Understand, CO3)*
Chapter 4: Crystallization	
1.	• Define crystallization and explain its significance in the purification of chemical products. *(L1 – Remember, CO1)*
2.	• Explain the factors affecting crystallization rate and crystal size. *(L2 – Understand, CO2)*
3.	• Differentiate between batch and continuous crystallizers with diagrams. *(L3 – Apply, CO2)*
4.	• Describe the construction and working of a vacuum crystallizer. *(L2 – Understand, CO3)*
5.	• Explain the concept of supersaturation and its role in crystallization. *(L2 – Understand, CO2)*
6	• Solve a numerical problem to calculate the yield of crystals from a saturated solution. *(L4 – Analyze, CO4)*
7	• Perform a material balance calculation for a crystallization process under steady-state conditions. *(L4 – Analyze, CO4)*
8	• Compare the working principles of evaporative crystallization and cooling crystallization. *(L3 – Apply, CO3)*
9	• Describe the design considerations for crystallizers used in the pharmaceutical industry. *(L2 – Understand, CO3)*