QUESTION BANK FOR INDUSTRIAL STOICHIOMETRY

Chapter 1: Units and Dimensions		**CO**	**BTL**
1	Define basic and derived units used in the process industry.	**C204.1**	**L1 (Remember)**
2	Define basic and derived units used in the process industry.	**C204.1**	**L1 (Remember)**
3	Convert a given measurement in one unit to an SI unit.	**C204.1**	**L3 (Apply)**
4	Analyze the need for different units in the measurement of physical and chemical properties in industrial processes.	**C204.1**	**L4 (Analyze)**
5	Critically evaluate the importance of dimensional analysis in simplifying complex process calculations.	**C204.1**	**L5 (Evaluate)**
6	Create a flow chart of unit conversions for different units commonly used in chemical engineering processes.	**C204.1**	**L6 (Create)**
7	Explain the relationship between units and dimensions in process industry calculations.	**C204.1**	**L2 (Understand)**
Chapter 2: Mole Concept		**CO**	**BTL**
1	What is the definition of a mole?	**C204.2**	**L1 (Remember)**
2	Explain the concept of mole fraction and mass fraction with respect to chemical equations.	**C204.3**	**L2 (Understand)**
3	Solve a problem involving the conversion of moles to mass fraction in a given mixture.	**C204.4**	**L3 (Apply)**
4	Analyze how mole concept is applied in calculating the composition of mixtures and solutions.	**C204.5**	**L4 (Analyze)**
5	Evaluate the application of the principle of atom conservation in chemical reactions and its significance in stoichiometric calculations.	**C204.2**	**L5 (Evaluate)**
6	Create a real-world scenario where mole concept could be applied in an industrial process.	**C204.2**	**L6 (Create)**
Chapter 3 Stoichiometry			
1	What is the concept of limiting reactant?	**C204.3**	**L1 (Remember)**
2	Describe the steps involved in solving a stoichiometry problem based on mass-mass and mass-volume relationships.	**C204.3**	**L2 (Understand)**
3	Solve a stoichiometry problem involving mass-mass calculations in an industrial chemical reaction.	**C204.3**	**L3 (Apply)**
4	Analyze the impact of the limiting reactant on the yield of a chemical reaction.	**C204.3**	**L4 (Analyze)**
5	Evaluate the importance of stoichiometric calculations in ensuring proper reactor design and operation.	**C204.3**	**L5 (Evaluate)**
6	Design a simple chemical reaction with given reactants and predict the products based on stoichiometric calculations.	**C204.3**	**L6 (Create)**
Chapter 4 Gases and Gaseous Mixtures		**CO**	**BTL**
1	State the Ideal Gas Law equation and define its parameters.	**C204.2**	**L1 (Remember)**

2	Explain the relationship between volume, pressure, and temperature in gaseous mixtures according to the Ideal Gas Law.	**C204.2**	**L2 (Understand)**
3	Solve a problem involving the application of the Ideal Gas Law to determine the pressure of a gas mixture.	**C204.2**	**L3 (Apply)**
4	Analyze the effects of temperature and pressure on the density of a gas mixture.	**C204.2**	**L4 (Analyze)**
5	Evaluate the significance of Dalton's Law and Raoult's Law in the composition of a gas mixture.	**C204.2**	**L5 (Evaluate)**
6	Create an industrial case study where gas law calculations are essential in process design or operation.	**C204.2**	**L6 (Create)**
Chapter 5: Transportation and Storage		**CO**	**BTL**
1	Define material balance and state the Law of Conservation of Mass.	**C204.3**	**L1 (Remember)**
2	Explain the importance of material balance in industrial processes like mixing, evaporation, and distillation.	**C204.3**	**L2 (Understand)**
3	Solve a problem involving material balance for a distillation process.	**C204.3**	**L3 (Apply)**
4	Analyze the impact of incomplete material balance on product quality in an industrial unit operation.	**C204.3**	**L4 (Analyze)**
5	Evaluate the significance of applying material balance in ensuring the efficiency of a chemical plant operation.	**C204.3**	**L5 (Evaluate)**
6	Design a mixing operation and calculate the material balance for the input and output streams.	**C204.3**	**L6 (Create)**
Chapter 6:		**CO**	**BTL**
1	Define the concepts of conversion, yield, and selectivity in chemical reactions.	**C204.3**	**L1 (Remember)**
2	Explain how material balance with chemical reactions differs from material balance without chemical reactions.	**C204.3**	**L2 (Understand)**
3	Solve a material balance problem involving chemical reactions, excess reactants, and yield calculations.	**C204.3**	**L3 (Apply)**
4	Analyze the effect of excess air and recycle in combustion reactions and their impact on material balance.	**C204.3**	**L4 (Analyze)**
5	Evaluate the effectiveness of applying the concept of recycle and bypass in improving the efficiency of a combustion process.	**C204.3**	**L5 (Evaluate)**
6	Create a material balance for a combustion reaction in an industrial furnace, incorporating excess air and recycle.	**C204.3**	**L6 (Create)**