Chemistry 12

Unit II Dynamic Equilibrium

Prescribed Learning Outcomes

The following grid contains all the prescribed learning outcomes (2007 / 2008) for the Dynamic Equilibrium unit of Chemistry 12. Use this in conjunction with the Kinetics Study Guide to determine your level of competence and understanding of each learning outcome. Once you are confident that you completely understand each learning outcome, place a check mark in the square provided.

Please Note: The Chemistry 12 Study Guides are based on the OLD PLO's. Use the "Study Guide Equivalent" column to match up the old PLO's to the new ones.

Prescribed Learning Outcomes	Achievement Indicators	Study Guide Equivalent	Status
B1 explain the concept of chemical equilibrium with reference to reacting systems	Describe the reversible nature of most chemical reactions and how it can be represented on a PE diagram	D1 & D2	❑
	Describe the dynamic nature of chemical equilibrium	D5	❑
	Relate the changes in rates of the forward and reverse reactions to the changing concentrations of the reactants and products as equilibrium is established	D3	❑
	Describe chemical equilibrium as a closed system at constant temperature: - Whose macroscopic properties are constant - Where the forward and reverse reaction rates are equal - That can be achieved from either direction - Where the concentration of reactants and products are constant	D4	❑
	Infer that a system not at equilibrium will tend to move toward a position of equilibrium	D6	❑
B2 predict, with reference to entropy and enthalpy, whether reacting systems will reach equilibrium	Explain the significance of enthalpy	D8 (?)	❑
	Determine entropy and enthalpy changes from a chemical equation (qualitatively)	D7	❑
	Predict the result when enthalpy and entropy factors - Both favour the products - Both favour the reactants - Oppose one another	D9	❑
B3 apply Le Chatelier's principle to the shifting of equilibrium	Explain the term shift as it applies to equilibria	E1	❑
	Describe shifts resulting from the following: - Temperature change - Concentration change - Volume change of gaseous systems	E2	❑
	Explain equilibrium shifts using the concepts of reaction kinetics	E3	❑
	Identify the effect of a catalyst on dynamic equilibrium	E4	❑
B4 apply the concepts of equilibrium to a commercial or industrial process	Describe the Haber process for the production of ammonia (NH_3)	E5	❑

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B5 draw conclusions from the equilibrium constant expression	Gather and interpret data on the concentration of reactants and products of a system at equilibrium	F1	❑
	Write the expression for the equilibrium constant when given the equation for either a homogeneous or heterogeneous equilibrium system	F2	❑
	Explain why certain terms (i.e. pure solids and liquids) are not included in the equilibrium constant expression	N/A	❑
	Relate the equilibrium position to the value of K_{eq} and vise versa	F3	❑
	Predict the effect (or lack of effect) on the value of K_{eq} of changes in the following factors: - Temperature - Pressure - Concentration - Surface Area - Catalyst	F4	❑
B6 perform calculations to evaluate the changes in K_{eq} and in concentration of substances within an equilibrium system	Perform calculations involving the value of K_{eq} and the equilibrium concentration of all species	F5	❑
	Perform calculations involving the value of K_{eq}, the initial concentration of all species, and one equilibrium concentration	F6	❑
	Perform calculations involving the equilibrium concentrations of all species, the value of K_{eq}, and the initial concentrations	F7	❑
	Determine whether a system is at equilibrium, and if not, in which direction it will shift to reach equilibrium when given a set of concentrations for reactants and products	F8	❑