Learning Guide to Chapter 18

Reaction Equilibrium

Name _____

Class _____

Date _____

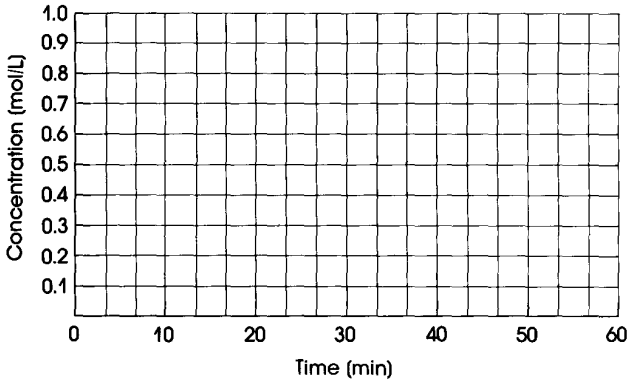
A. Equilibrium Concentrations

The decomposition of phosphorus pentachloride, PCl_5, into phosphorus trichloride and chlorine gas is a reversible reaction that reaches a state of chemical equilibrium. The equilibrium reaction is

$$PCl_5(g) \rightleftharpoons PCl_3(g) + Cl_2(g)$$

One mole of PCl_5 is placed in a sealed one-liter container and heated to a constant temperature. The concentrations of reactant and products are measured at ten-minute intervals. The following data are collected. Plot this data on the grid provided. Answer the questions that follow.

Time (min)	Concentrations (moles per liter)		
	$[PCl_5]$	$[PCl_3]$	$[Cl_2]$
0	1.00	0.00	0.00
10	0.90	0.10	0.10
20	0.85	0.15	0.15
30	0.82	0.18	0.18
40	0.80	0.20	0.20
50	0.80	0.20	0.20
60	0.80	0.20	0.20



1. The following picture represents the one-liter container of PCl_5 gas before the reaction begins. The one mole of PCl_5 is represented by ten molecules. In the next two boxes, draw pictures representing the container on a submicroscopic level at ten minutes and at forty minutes.