

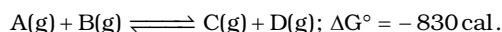



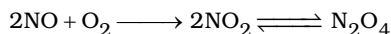
Date Planned : __ / __ / __	Daily Tutorial Sheet-15	Expected Duration : 90 Min
Actual Date of Attempt : __ / __ / __	Level-3	Exact Duration : _____

- 159.** The density of an equilibrium mixture of  $\text{N}_2\text{O}_4$  and  $\text{NO}_2$  at 1atm and 373.5K is 2.0g/L. Calculate  $K_C$  for the reaction  $\text{N}_2\text{O}_4(\text{g}) \rightleftharpoons 2\text{NO}_2(\text{g})$ . 


- 160.** Calculate the equilibrium concentration ratio of C to A if equimolar ratio of A and B were allowed to come to equilibrium at 300 K. 

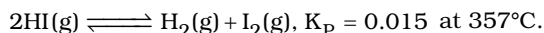
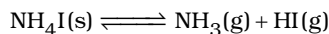


- 161.** A 250 mL flask, and 100 mL flask are separated by a stop cock. At 350K, the nitric oxide in the larger flask exerts a pressure of 0.46 atm and the smaller one contains oxygen at 0.86atm. The gases are mixed by opening the stop cock. The reactions occurring are 




The first reaction is complete while the second one is at equilibrium. Assuming all the gases to behave ideally, calculate the  $K_p$  for the equilibrium reaction if the final total pressure is 0.37atm.

- 162.** Solid  $\text{NH}_4\text{I}$  upon rapid heating in a closed vessel at 357°C develops a constant pressure of 275mm Hg owing to the partial decomposition of  $\text{NH}_4\text{I}$  into  $\text{NH}_3$  and HI but the pressure gradually increase further (when excess solid residually remain in the vessel) owing to the dissociation of HI. Calculate the final pressure developed under equilibrium. 



- 163.** A container whose volume is V, contains an equilibrium mixture that consists of 2 moles each of  $\text{PCl}_5$ ,  $\text{PCl}_3$  and  $\text{Cl}_2$  (all gases). The pressure is 30.3975 kPa and temperature is T. A certain amount of  $\text{Cl}_2(\text{g})$  is now introduced keeping the pressure, and temperature constant until the equilibrium volume changes to 2V. Calculate the amount of  $\text{Cl}_2$  that was added and the value of  $K_p$ .

- 164.**  $\text{PCl}_5$  dissociates into  $\text{PCl}_3$  and  $\text{Cl}_2$  as  $\text{PCl}_5(\text{g}) \rightleftharpoons \text{PCl}_3(\text{g}) + \text{Cl}_2(\text{g})$  

If the total pressure of the system in equilibrium is P at a density  $\rho$  and temperature T, show that Degree of dissociation  $\alpha = \frac{PM}{\rho RT} - 1$  where M is the relative molar mass of  $\text{PCl}_5$ . If the vapour density of the gas mixture at equilibrium has the value of 62 when the temperature is 230°C, what is the value of  $P/\rho$ ?