THIRUVANANTHAPURAM EDUCATIONAL DISTRICT CHEMISTRY X CHAPTER 5 MODULE 2 ANSWER KEY

1.a.Ammonia and Hydrogen chloride

b. Ammonia changes red litmus to blue

Hydrogen chloride changes blue litmus to red

c. $NH_4Cl \rightarrow NH_3 + Hcl$

d.The evolving ammonia and hydrogen chloride recombine together form ammonium chloride $NH_{3+}HCl \rightarrow NH_4Cl$

- e. Forward reaction $NH_4Cl \rightarrow NH_3 + HCl$ Backward reaction $NH_{3+}HCl \rightarrow NH_4Cl$
- 2. a.Irreversible reaction -graph(i) Reversible reaction -graph(iii)
 - b. A- State of equilibrium C- Forward reaction D-Backward reaction
- 3. Chemical equilibrium is <mark>dynamic</mark> at the molecular level. Chemical equilibrium is attained in <mark>closed</mark> systems.
- 4. Total no. of moles of reactants—2moles Total no. of moles of products---2moles

b. In this reaction pressure has no influence because no. of moles of reactants and products are equal.

5 a. Backward reaction

- b. Forward reaction increases
- c. Forward reaction decreases

d.According to Le Chateliers' principle, for the formation of a larger amount of NH₃, the temperature has to be reduced. But at low temperature the number of molecules having threshold energy will be less. Therefore the rates of forward and backward reactions get very much reduced, the system will take more time to reach equilibrium. Hence in the manufacture of ammonia, 450 °C is taken as the optimum temperature.

e. Haber process

6. a.The amount of NO₂ increases

b. N₂O₄+ Heat 2NO 2 1 mole 2moles

On lowering the pressure forward reaction increases. Reason: In a gaseous system, increase in the number of molecules helps to increase the pressure.According to Le Chateliers' principle, when pressure of a system at equilibrium is decreased the system will try to attain equilibrium by increasing pressure. ie forward reaction increases