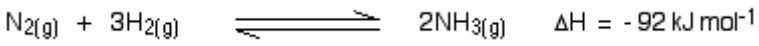
THE HABER PROCESS

1. The Haber Process combines nitrogen from the air with hydrogen derived mainly from natural gas (methane) into ammonia. The reaction is reversible and the production of ammonia is exothermic.



State the following conditions for the reaction:

a) proportion of nitrogen to hydrogen;

b) temperature;

c) pressure;

d) catalyst;

e) how the ammonia is removed from the equilibrium mixture.

2. There are a number of ways that the choice of conditions affects the process:

   - their effect on the position of equilibrium;
   - their effect on the rate of the reaction;
   - their effect on the economics of the process.

   By considering each of these (where relevant), explain the choice of the conditions you gave in question 1 with respect to

   a) the choice of temperature;

   b) the choice of pressure;

   c) the use of the catalyst.