If bond enthalpies of N≡N, H-H, N-H bonds are x1, x2 and x3 respectively, then heat of formation of NH_3 will be:

a) X1 + 3x2 - 6x3
b) 0.5x1 + 1.5x2 - 3x3
c) 3x3 - 0.5x1 - 1.5x2
d) 6x3 - x1 - 3x2

Solution: b)

Explanation:

$N_2 + 3H_2 \rightarrow 2NH_3$

$0.5N_2 + 1.5H_2 \rightarrow NH_3$

So, for formation of 1 mol NH_3, 0.5 mol N_2 and 1.5 mol H_2 required.

Enthalpy of formation = 0.5x1 + 1.5x2 - 3x3