Question #28431

Hydrochloric acid is
an important commercial acid.
Hydrochloric
acid reacts with ammonium hydroxide forming ammonium
chloride.
(i)
Write the acid base chemical equation for above reaction.
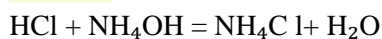(ii)
Calculate the amount HCl required in kilograms to react
with 25 kg ammonium hydroxide.
(iii)
Calculate the amount of HCl required to obtain 30 kg of
ammonium chloride

Answer:

Hydrochloric
acid reacts with ammonium hydroxide forming ammonium
chloride:

$HCl + NH_4OH = NH_4Cl + H_2O$

Reagents react in a 1:1 ratio

Based proportion of $m\,(HCl) / M\,(HCl) = m\,(NH_4OH) / M\,(NH_4OH)$

2) $M\,(HCl) = 1+35.5=36.5$

$M\,(NH_4OH)=14+5+16=35$

$m\,(HCl) = 36.5*25/35 = 25.07$ kg

Based proportion of $m\,(HCl) / M\,(HCl) = m\,(NH_4Cl) / M\,(NH_4Cl)$

3) $M(NH_4Cl) =14+4+35.5=53.5$

$m\,(HCl) = 36.5*30/53.5 = 20.46$ kg