#68538 Chemistry, Other

What is the final solution pH after 60 mL 0.05 M $Ba(OH)_2$ is mixed with 25 mL 0.20 M HNO_3?

Answer:

$Ba(OH)_2 + 2HNO_3 = Ba(NO_3)_2 + 2H_2O$

$Ba(OH)_2$ is a strong alkali. HNO_3 is a strong acid.

In order to determine pH, we have to determine limiting reagent.

According to equation, $n(Ba(OH)_2) = 2 \cdot n(HNO_3)$

$C_M = n/V$ $n = C_M \cdot V$

$n(Ba(OH)_2) = 0.05 \cdot 60 = 3$ mmol

$n(HNO_3) = 0.2 \cdot 25 = 5$ mmol But it must be: $2 \cdot n(Ba(OH)_2) = 3 \cdot 2 = 6$ mmol

Therefore, HNO_3 is the limiting reagent. There will be an excess of $Ba(OH)_2$ of (3-5/2=0.5 mmol) with an anticipated basic pH.

pOH = -lg[0.0005] = 3.3

pH+pOH = 14

pH = 14-3.3 = 10.7