(A) $3H_{2(g)} + N_{2(g)} \rightleftharpoons 2NH_{3(g)}$

At EQ, at a certain T, you measure

$[NH_3] = 0.031M$, $[H_2] = 0.055M$, $[N_2] = 0.017M$

What is K at this T?

$$K = \frac{[NH_3]^2}{[H_2]^3[N_2]} = \frac{(0.031)^2}{(0.055)^3(0.017)} = 340$$

(B) $3H_2 + N_2 \rightleftharpoons 2NH_3$ $K = 340$

At a particular time, at the same T, you measure

$[NH_3] = [N_2] = [H_2] = 0.025M$

1) Are you at EQ?

2) If not, in which direction is the reaction "headed"?

$$Q = \frac{[NH_3]^2}{[H_2]^3[N_2]} = \frac{(0.025)^2}{(0.025)^3(0.025)} = 1600$$

$Q \neq K \Rightarrow Q \downarrow \Rightarrow [R] \uparrow [P] \downarrow$

$Q > K \Rightarrow$ reverse reaction is favored (faster)

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1) Are you at EQ?

2) If not, in which direction is the reaction "headed"?

$$Q = \frac{[NH_3]^2}{[H_2]^3[N_2]} = \frac{(0.025)^2}{(0.075)^3(0.025)} = 1600$$

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