Equilibrium #3b

Describe the effect of the changes on each equilibrium.

Key
→ denotes shift to products
← denotes shift to reactants
↑ denotes increase
↓ denotes decrease
NC denotes no change

1. $2ICl_{(g)} \text{ <----> } I_{2(g)} + Cl_{2(g)} \quad \blacktriangle H = +$
   a. increase volume NC
   b. decrease temperature ←
   c. increase partial pressure of $I_{2(g)}$ ←
   d. effect of c. on $Cl_{2(g)}$ concentration ↓

2. $N_{2(g)} + O_{2(g)} \text{ <----> } 2NO_{(g)} \quad \blacktriangle H = -$
   a. decrease volume NC
   b. increase temperature ←
   c. increase partial pressure of $O_{2(g)}$ →
   d. effect of c. on $N_{2(g)}$ concentration ↓

3. $3O_{2(g)} \text{ <----> } 2O_{3(g)} \quad \blacktriangle H = -$
   a. decrease volume →
   b. increase temperature ←
   c. increase partial pressure of $O_{2(g)}$ →
   d. effect of c. on $O_{3(g)}$ concentration ↑

4. $N_2O_{3(g)} \text{ <----> } NO_{(g)} + NO_{2(g)} \quad \blacktriangle H = +$
   a. increase volume →
   b. decrease temperature ←
   c. increase partial pressure of $NO_{2(g)}$ ←
   d. effect of c. on $NO_{(g)}$ concentration ↓

5. $2H_{2(g)} + 2NO_{(g)} \text{ <----> } N_{2(g)} + 2H_2O_{(g)} \quad \blacktriangle H = -$
   a. decrease volume →
   b. increase temperature ← N_2
   c. increase partial pressure of $_{2(g)}$ ←
   d. effect of c. on $_{(g)}$ concentration ↑

6. $2Bi^{3+}_{(aq)} + 3H_2S_{(g)} \text{ <----> } Bi_2S_{3(s)} + 6H^+_{(aq)} \quad \blacktriangle H = -$
   a. increase volume ←
   b. increase $[H^+]$ (decrease pH) ←
   c. add more $Bi_2S_{3(s)}$ NC
   d. add NaOH →

7. $CaCO_{3(s)} \text{ <----> } CaO_{(s)} + CO_{2(g)} \quad \blacktriangle H = +$
   a. decrease volume ←
   b. add $Ar_{(g)}$ at constant **volume** NC
   c. add $Ar_{(g)}$ at constant **pressure** →
   d. add a catalyst NC

8. $CaC_{2(s)} + 2H_2O_{(l)} <----> C_2H_{2(g)} + Ca(OH)_{2(s)}$ $\blacktriangle H = +$
   a. add more water NC
   b. increase pressure by changing volume ←
   c. add more $CaC_{2(s)}$ NC
   d. heat up the mixture →

9. $C_6H_{6(l)} + Br_{2(l)} <----> C_6H_5Br_{(l)} + HBr_{(g)}$ $\blacktriangle H = +$
   a. add more $C_6H_5Br_{(l)}$ ←
   b. decrease pressure by changing volume →
   c. increase the temperature →
   d. add a catalyst NC

10. $Cu_{(s)} + 2Ag^+_{(aq)} <----> Cu^{2+}_{(aq)} + 2Ag_{(s)}$
   a. add more $Cu_{(s)}$ NC
   b. add some HCl ←
   c. add some $Cu(NO_3)_2$ ←
   d. add more $Ag_{(s)}$ NC

11. $4NH_{3(g)} + 5O_{2(g)} <----> 6H_2O_{(g)} + 4NO_{(g)}$ $\blacktriangle H = +$
   a. increase the partial pressure of $NO_{(g)}$ ←
   b. decrease the temperature ←
   c. add $Ne_{(g)}$ at constant pressure →
   d. add $Ne_{(g)}$ at constant volume NC

12. $H_{2(g)} + \frac{1}{2}O_{2(g)} <----> H_2O_{(l)}$ $\blacktriangle H = -$
   a. add $H_2O_{(l)}$ NC
   b. decrease the partial pressure of $O_{2(g)}$ ←
   c. increase the temperature ←
   d. decrease the volume →

13. $CO_{(g)} + \frac{1}{2}O_{2(g)} <----> CO_{2(g)}$ $\blacktriangle H = -$
   a. add $CO_{2(g)}$ ←
   b. decrease the partial pressure of $O_{2(g)}$ ←
   c. increase the temperature ←
   d. decrease the volume →

14. $I_{2(g)} + Cl_{2(g)} <----> 2ICl_{(g)}$ $\blacktriangle H = -$
   a. add $Cl_{2(g)}$ →
   b. decrease the partial pressure of $I_{2(g)}$ ←
   c. increase the temperature ←
   d. decrease the volume NC