Answer the following reactions. Balance all charges, balance the reaction, include states when known. Write NR if no reaction occurs.

1. \( \text{H}_2 \text{(g)} + \text{Na}_3\text{AsO}_4 \text{(aq)} \rightarrow \)

2. \( \text{Ca(OH)}_2 \text{(aq)} + \text{H}_3\text{PO}_4 \text{(aq)} \rightarrow \)

3. \( \text{KBr } \text{(aq)} + \text{F}_2 \text{(g)} \rightarrow \)

4. \( \text{C}_2\text{H}_5\text{OH} + \text{O}_2 \text{(g)} \rightarrow \)

5. \( \text{Mg } \text{(s)} + \text{HI } \text{(aq)} \rightarrow \)

6. \( \text{(NH}_4\text{)}_2\text{S } \text{(aq)} + \text{Zn(OH)}_2 \text{(s)} \rightarrow \)

7. \( \text{(NH}_4\text{)}_3\text{PO}_4 \text{(aq)} + \text{AgOH} \ ( ) \rightarrow \)

8. \( \text{H}_3\text{PO}_4 \text{(aq)} + \text{KOH } \text{(aq)} \rightarrow \)

9. \( \text{NiI}_2 \ ( ) + \text{K } \text{(s)} \rightarrow \)

10. \( \text{AgI } \text{(s)} + \text{Br}_2 \text{(l)} \rightarrow \)

11. \( \text{C}_4\text{H}_10 + \text{O}_2 \text{(g)} \rightarrow \)

12. \( \text{(NH}_4\text{)}_3\text{PO}_4 \text{(aq)} + \text{KOH } \text{(aq)} \rightarrow \)

13. \( \text{Sc(OH)}_3 \text{(aq)} + \text{HF } \text{(aq)} \rightarrow \)

14. \( \text{H}_2\text{CrO}_4 \ ( ) + \text{Al}_2\text{(CO}_3\text{)}_3 \ ( ) \rightarrow \)

15. \( \text{C}_4\text{H}_9\text{OH} + \text{O}_2 \text{(g)} \rightarrow \)

16. \( \text{K } \text{(s)} + \text{Ni}_3\text{(PO}_4\text{)}_2 \ ( ) \rightarrow \)

17. \( \text{C}_3\text{H}_8 + \text{O}_2 \text{(g)} \rightarrow \)

18. \( \text{K}_3\text{AsO}_4 \text{(aq)} + \text{Al} \text{(s)} \rightarrow \)

19. \( \text{HBr } \text{(aq)} + \text{F}_2 \text{(g)} \rightarrow \)

20. \( \text{Mg(OH)}_2 \text{(aq)} + \text{HF } \text{(aq)} \rightarrow \)
Question 1: \[ \_{ } \text{H}_2 (g) + \_{ } \text{Na}_3 \text{AsO}_4 (aq) \rightarrow \_ \text{NR} \]

Question 2: \[ 3 \text{ Ca(OH)}_2 (aq) + 2 \text{ H}_3 \text{PO}_4 (aq) \rightarrow 1 \text{ Ca}_3(\text{PO}_4)_2 (s) + 6 \text{ H}_2 \text{O} (l) + \text{ heat} \]

Question 3: \[ 2 \text{ KBr (aq)} + 1 \text{ F}_2 (g) \rightarrow 1 \text{ Br}_2 (l) + 2 \text{ KF (}) \]

Question 4: \[ 1 \text{ C}_2\text{H}_5\text{OH} + 3 \text{ O}_2 (g) \rightarrow 2 \text{ CO}_2 (g) + 3 \text{ H}_2 \text{O} (g) + \text{ heat} \]

Question 5: \[ 1 \text{ Mg (s)} + 2 \text{ HI (aq)} \rightarrow 1 \text{ H}_2 (g) + 1 \text{ MgI}_2 (aq) \]

Question 6: \[ 1 \text{ (NH}_4\text{)}_2\text{S (aq)} + 1 \text{ Zn(OH)}_2 (s) \rightarrow 1 \text{ ZnS (s)} + 2 \text{ H}_2 \text{O} (l) + 2 \text{ NH}_3 (g) \]

Question 7: \[ 1 \text{ (NH}_4\text{)}_3\text{PO}_4 (aq) + 3 \text{ KOH (aq)} \rightarrow 1 \text{ K}_3\text{PO}_4 (aq) + 3 \text{ H}_2 \text{O} (l) + \text{ heat} \]

Question 8: \[ 1 \text{ H}_3\text{PO}_4 (aq) + 3 \text{ K}_2\text{O (aq)} \rightarrow 1 \text{ K}_3\text{PO}_4 (aq) + 3 \text{ H}_2 \text{O} (l) + \text{ heat} \]

Question 9: \[ 2 \text{ K (s)} + 1 \text{ NiI}_2 (s) \rightarrow 1 \text{ Ni (s)} + 2 \text{ KI (aq)} \]

Question 10: \[ 2 \text{ AgI (s)} + 1 \text{ Br}_2 (l) \rightarrow 1 \text{ I}_2 (s) + 2 \text{ AgBr (s)} \]

Question 11: \[ 2 \text{ C}_4\text{H}_10 + 13 \text{ O}_2 (g) \rightarrow 8 \text{ CO}_2 (g) + 10 \text{ H}_2 \text{O} (g) + \text{ heat} \]

Question 12: \[ 1 \text{ (NH}_4\text{)}_3\text{PO}_4 (aq) + 3 \text{ KOH (aq)} \rightarrow 1 \text{ K}_3\text{PO}_4 (aq) + 3 \text{ H}_2 \text{O} (l) + 3 \text{ NH}_3 (g) \]

Question 13: \[ 1 \text{ Sc(OH)}_3 (aq) + 3 \text{ HF (aq)} \rightarrow 1 \text{ ScF}_3 (s) + 3 \text{ H}_2 \text{O} (l) + \text{ heat} \]

Question 14: \[ 3 \text{ H}_2\text{CrO}_4 (s) + 1 \text{ Al}_2(\text{CO}_3)_3 (s) \rightarrow 1 \text{ Al}_2(\text{CrO}_4)_3 (s) + 3 \text{ H}_2 \text{O} (l) + 3 \text{ CO}_2 (g) \]

Question 15: \[ 1 \text{ C}_4\text{H}_9\text{OH} + 6 \text{ O}_2 (g) \rightarrow 4 \text{ CO}_2 (g) + 5 \text{ H}_2 \text{O} (g) + \text{ heat} \]

Question 16: \[ 6 \text{ K (s)} + 1 \text{ Ni}_3(\text{PO}_4)_2 (s) \rightarrow 3 \text{ Ni (s)} + 2 \text{ K}_3\text{PO}_4 (aq) \]

Question 17: \[ 1 \text{ C}_3\text{H}_8 + 5 \text{ O}_2 (g) \rightarrow 3 \text{ CO}_2 (g) + 4 \text{ H}_2 \text{O} (g) + \text{ heat} \]

Question 18: \[ \text{ } \text{K}_3\text{AsO}_4 (aq) + \text{ } \text{Al (s)} \rightarrow \text{NR} \]

Question 19: \[ 2 \text{ HBr (aq)} + 1 \text{ F}_2 (g) \rightarrow 1 \text{ Br}_2 (l) + 2 \text{ HF (aq)} \]

Question 20: \[ 1 \text{ Mg(OH)}_2 (aq) + 2 \text{ HF (aq)} \rightarrow 1 \text{ MgF}_2 (s) + 2 \text{ H}_2 \text{O} (l) + \text{ heat} \]