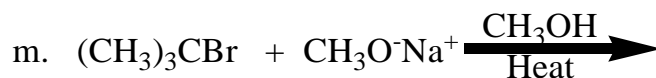
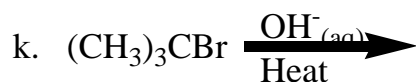
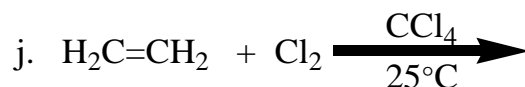
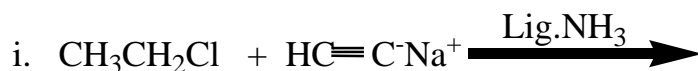
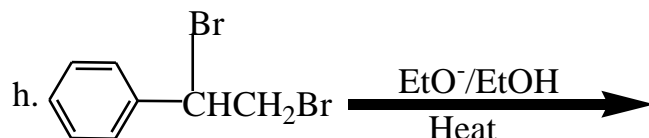
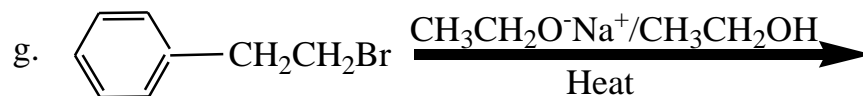
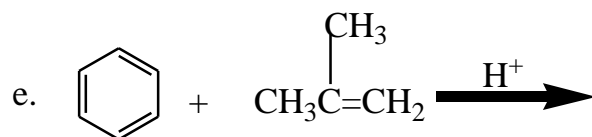
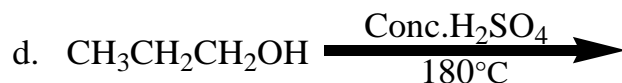
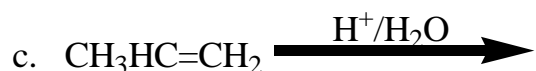
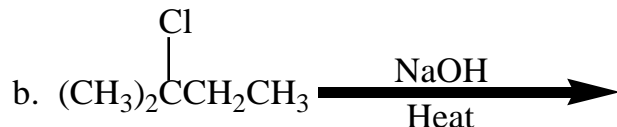
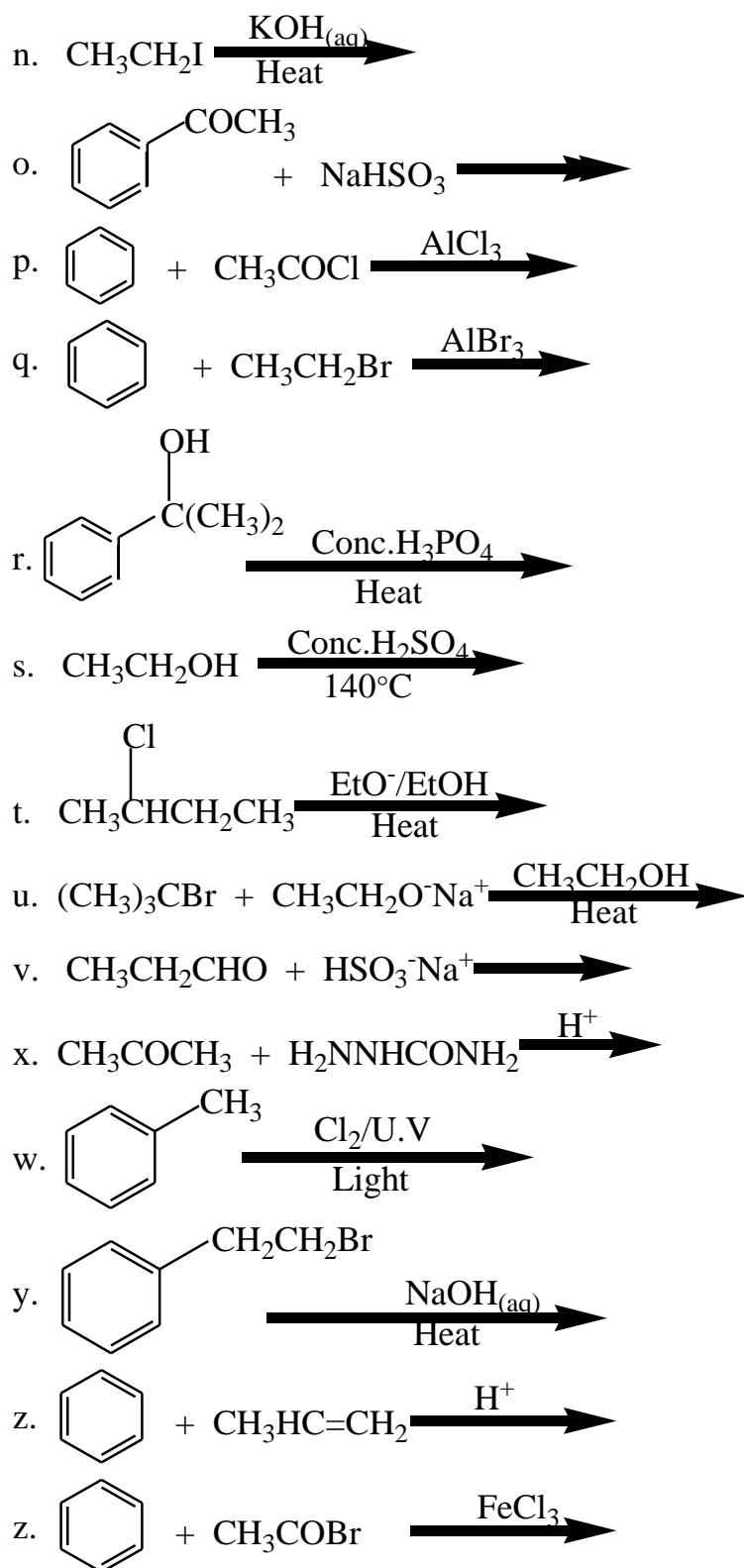


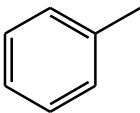


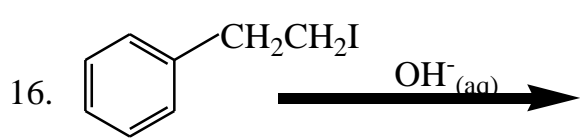
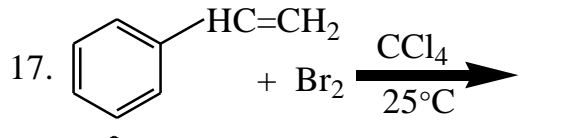
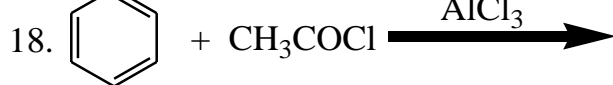


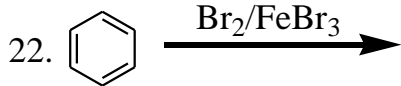
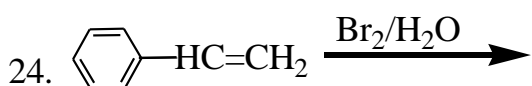
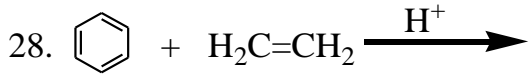
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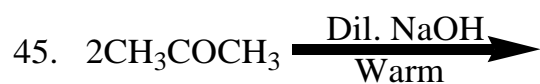
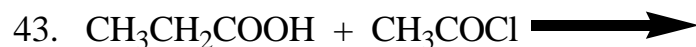
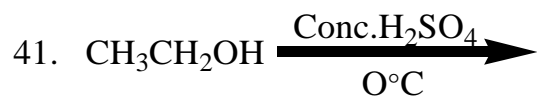
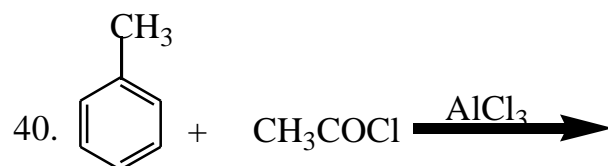
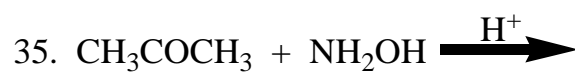
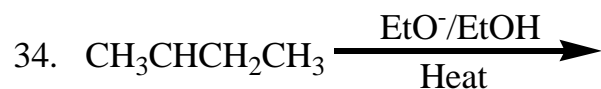
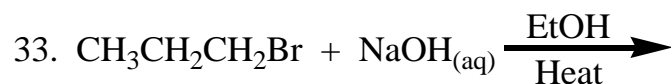
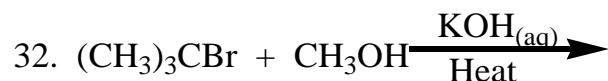
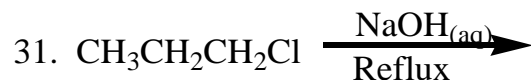
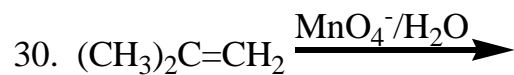
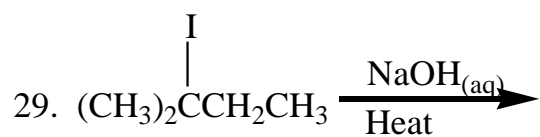
1. Complete the following equations and write the accepted mechanism for the reaction in each case.

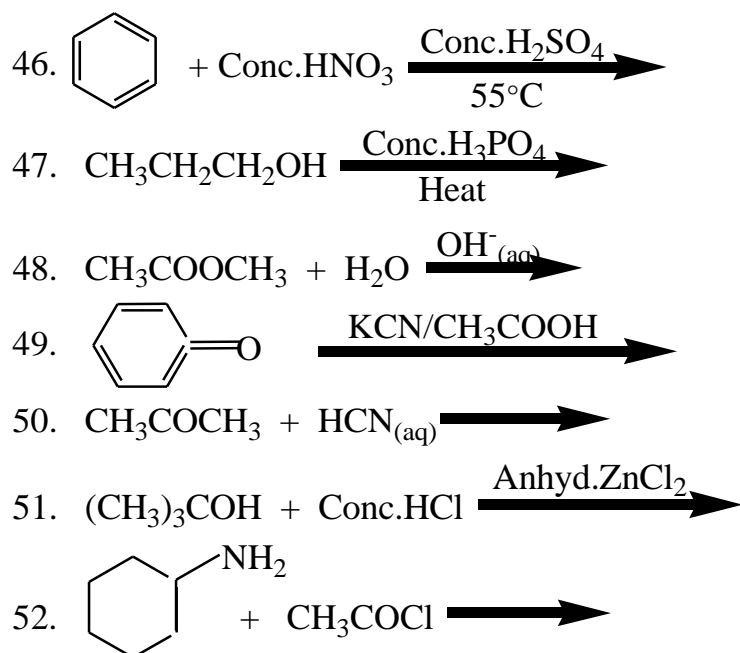




1. $\text{CH}_3\overset{\text{OH}}{\text{C}}\text{HCH}_3 \xrightarrow[\text{Heat}]{\text{Conc. H}_2\text{SO}_4}$
2. $\text{CH}_3\text{CH}_2\text{OH} \xrightarrow[140^\circ\text{C}]{\text{Conc. H}_2\text{SO}_4}$
3. $(\text{CH}_3)_3\text{CBr} \xrightarrow[\text{Heat}]{\text{C}_2\text{H}_5\text{O}^-\text{K}^+/\text{C}_2\text{H}_5\text{OH}}$
4. $\text{CH}_3\text{HC}=\text{CHCH}_3 \xrightarrow{\text{Conc. H}_2\text{SO}_4/\text{H}_2\text{O}}$
5. $\text{CH}_3\text{CHO} + \text{NaHSO}_3 \longrightarrow$
6. $\text{CH}_3\text{CH}_2\text{CH}_2\text{Br} + \text{CH}_3\text{CH}_2\text{O}^-\text{Na}^+ \xrightarrow[\text{Heat}]{\text{CH}_3\text{CH}_2\text{OH}}$
7.  + $\text{Br}_2 \xrightarrow{\text{Fe}_{(s)}/\text{Heat}}$
8.  + $\text{CH}_3\text{HC}=\text{CH}_2 \xrightarrow{\text{H}_2\text{SO}_4}$
9. $(\text{CH}_3)_3\text{C}=\text{O} + \text{C}_6\text{H}_5\text{NHNH}_2 \xrightarrow{\text{H}^+}$
10. $\text{CH}_3\text{CH}_2\text{CHO} + \text{C}_6\text{H}_5\text{NHNH}_2 \xrightarrow{\text{H}^+}$
11.  $\xrightarrow[\text{Heat}]{\text{OH}^-_{(aq)}}$
12. $\text{CH}_3\text{CH}_2\text{CHO} + \text{NH}_2\text{NH}_2 \xrightarrow{\text{H}^+}$
13. $\text{CH}_3\overset{\text{OH}}{\text{C}}\text{HCH}_3 \xrightarrow[\text{Heat}]{\text{Conc. H}_2\text{SO}_4}$
14. $\text{CH}_3\text{HC}=\text{CHCH}_3 \xrightarrow{\text{Cl}_2/\text{H}_2\text{O}}$


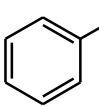
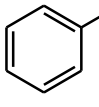
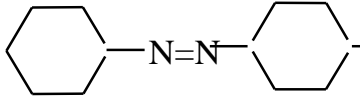
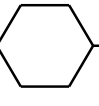
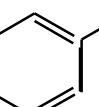
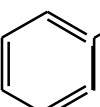
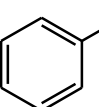
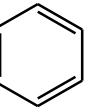
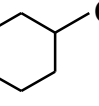
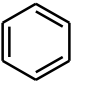
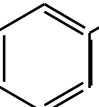
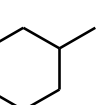
15. $(\text{CH}_3)_2\text{C}=\text{CH}_2 + \text{I}_2 \xrightarrow[25^\circ\text{C}]{\text{CCl}_4}$
16. 
 $\text{C}_6\text{H}_6 + \text{CH}_2\text{CH}_2\text{I} \xrightarrow{\text{OH}^-_{(\text{aq})}}$
17. 
 $\text{C}_6\text{H}_6 + \text{HC}=\text{CH}_2 + \text{Br}_2 \xrightarrow[25^\circ\text{C}]{\text{CCl}_4}$
18. 
 $\text{C}_6\text{H}_6 + \text{CH}_3\text{COCl} \xrightarrow{\text{AlCl}_3}$
19. 
 $\text{C}_6\text{H}_{11}\text{OH} \xrightarrow[\text{Heat}]{\text{Conc. H}_3\text{PO}_4}$
20. $\text{CH}_3\text{COCH}_2\text{CH}_3 + \text{C}_6\text{H}_5\text{NHNH}_2 \xrightarrow{\text{H}^+}$
21. 
 $\text{C}_6\text{H}_6 \xrightarrow{\text{Cl}_2/\text{Fe}}$
22. 
 $\text{C}_6\text{H}_6 \xrightarrow{\text{Br}_2/\text{FeBr}_3}$
23. $\text{CH}_3\text{C}(\text{CH}_3)=\text{CHCH}_3 + \text{Conc. H}_2\text{SO}_4 \xrightarrow[\text{Warm}]{\text{H}_2\text{O}}$
24. 
 $\text{C}_6\text{H}_5\text{HC}=\text{CH}_2 \xrightarrow{\text{Br}_2/\text{H}_2\text{O}}$
25. $\text{CH}_3\text{BrCH}_2\text{Br} \xrightarrow[\text{Heat}]{\text{Excess KOH}_{(\text{aq})}/\text{EtOH}}$
26. $\text{CH}_3\text{HC}=\text{CH}_2 + \text{Cl}_2 \xrightarrow[25^\circ\text{C}]{\text{CCl}_4}$
27. $\text{CH}_3\text{HC}=\text{CH}_2 + \text{Br}_2 \xrightarrow{\text{H}_2\text{O}}$
28. 
 $\text{C}_6\text{H}_6 + \text{H}_2\text{C}=\text{CH}_2 \xrightarrow{\text{H}^+}$





2. Show how the following conversion can be effected and in each case, indicate the reagents and conditions for the reactions.

- (CH₃)₃CHOH from ethene
- (CH₃)₃CHOH from CH₃CH₂Br
- CH₃CH₂CH₂NH₂ from pentene
- Phenol from 2-phenylpropane
- Benzene from phenylmethanol
- CH₃CH₂CH₂COOH from propan-1-ol
- Ethanoylchloride from ethane
- Phenylbenzoate from phenylamine
- Phenol from nitrobenzene
- CH₃CH₂NH₂ from CH₃CH₂CH₂Cl
- CH₃CH₂OH from CH₃CH₂COCl
- CH₃CH₂COOH from CH₃CH₂OH
- CH₃COCH₃ from CH₃CH₂CH₂OH
- But-2-yne from propene
- Ethene from propan-2-ol
- CH₃CH₂OCH₂CH₃ from ethane
- Propene from acetic acid
- CH₃CONHCH₂CH₃ from CH₃Br
- Cyclohexene from aminobenzene
- CH₃CH₂NH₂ from CH₃CH₂COOH
- Phenylamine from benzoic acid
- Phenylmethanol from benzene
- (CH₃)₂C=NOH from ethanol

25.  from Cyclohexene
26.  from 
27.  from Benzene
28.  from Benzene
29.  from 
30.  from 
31.  from 
32.  from Benzaldehyde
33.  from Cyclohexene

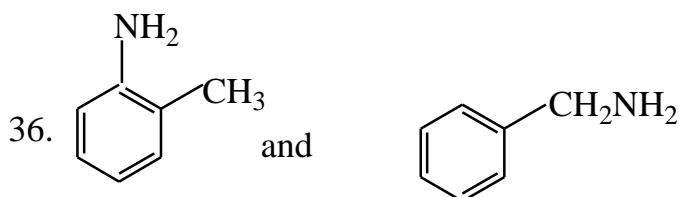
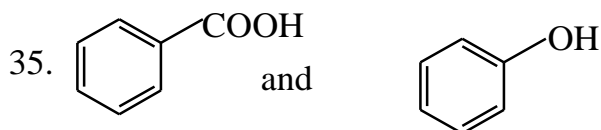
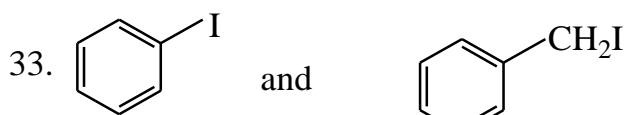
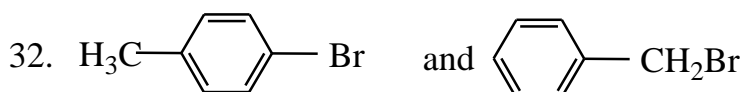
3. Name the reagents used to distinguish between each of the followings and in each case, state what would be observed and write equations of reactions where possible.

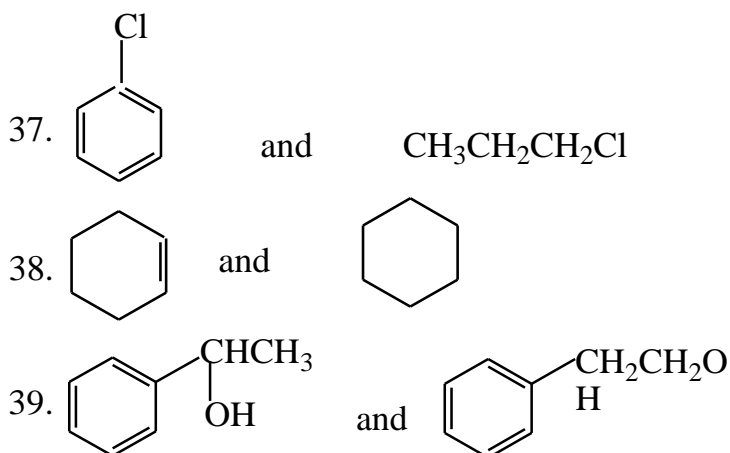
Part A Inorganic branch of chemistry:

1. Ni^{2+} and Cr^{3+}
2. Ca^{2+} and Ba^{2+}
3. Ca^{2+} and Mg^{2+}
4. Al^{3+} and Pb^{2+}
5. Sn^{4+} and Sn^{2+}
6. Pb^{2+} and Ag^+
7. Mn^{2+} and Pb^{2+}
8. SO_4^{2-} and SO_3^{2-}
9. CO_3^{2-} and Cl^-
10. HCO_3^- and CO_3^{2-}
11. Cl^- and F^-
12. NO_3^- and NO_2^-
13. SO_3^{2-} and $\text{S}_2\text{O}_3^{2-}$
14. $\text{C}_2\text{O}_4^{2-}$ and HCO_3^-
15. Br^- and Cl^-

Part B Organic branch of chemistry:

16. HCOO^- and CH_3COO^-
17. $\text{CH}_3\text{CH}_2\text{COCH}_2\text{CH}_3$ and $\text{CH}_3\text{CH}_2\text{CH}_2\text{COCH}_3$
18. CH_3CHO and $\text{CH}_3\text{CH}_2\text{CHO}$
19. $\text{CH}_3\text{CH}_2\text{NH}_2$ and $\text{CH}_3\text{CH}_2\text{NHCH}_3$
20. $\text{CH}_3(\text{CH}_2)_3\text{OH}$ and $(\text{CH}_3)_3\text{COH}$
21. $\text{CH}_3\text{CH}_2\text{CH}_2\text{OH}$ and $\text{CH}_3\text{CH}(\text{OH})\text{CH}_3$
22. $\text{CH}_3\text{CH}_2\text{CH}_2\text{I}$ and $\text{CH}_3\text{CH}_2\text{CH}_2\text{Cl}$
23. $\text{C}_6\text{H}_5\text{CHO}$ and $\text{C}_6\text{H}_5\text{CH}_2\text{CHO}$
24. $\text{CH}_3\text{CH}_2\text{COOH}$ and $\text{CH}_3\text{COOCH}_3$
25. $\text{CH}_3\text{CH}_2\text{COCH}_2\text{CH}_3$ and $\text{CH}_3\text{COCH}_2\text{CH}_3$
26. $\text{C}_6\text{H}_5\text{CHO}$ and $\text{C}_6\text{H}_5\text{CH}_2\text{COCH}_3$
27. CH_3OH and $\text{CH}_3\text{CH}_2\text{OH}$
28. HCOOH and CH_3COOH
29. CH_3CHO and $\text{CH}_3\text{CH}_2\text{CHO}$
30. Ethene and Ethyne
31. Propan-1-ol and 2-Methylpropan-2-ol





4. Write the half-cell equations for the followings conversions from 01 to 06 while 07 to 15 complete the half-cell equations.

1. $\text{S}_2\text{O}_8^{2-}$ to SO_4^{2-}
2. SO_3^{2-} to SO_4^{2-}
3. NO_2^- to NO_3^-
4. Mn^{2+} to MnO_2^-
5. MnO_2^- to MnO_4^{2-}
6. Mn^{2+} to MnO^{2-}
7. $\text{S}_2\text{O}_8^{2-}$ + I^-
8. Mn^{2+} + $\text{S}_2\text{O}_8^{2-}$
9. Sn^{2+} + $\text{S}_2\text{O}_8^{2-}$
10. Fe^{2+} + $\text{S}_2\text{O}_8^{2-}$
11. Cl^- + SO_3^{2-}
12. Fe^{3+} + SO_3^{2-}
13. $\text{Cr}_2\text{O}_7^{2-}$ + SO_3^{2-}
14. MnO_4^- + SO_3^{2-}
15. $\text{Cr}_2\text{O}_7^{2-}$ + NO_2^-

5. Write the names of the following compounds and state their oxidation states and coordination numbers.

| Structres | Names | O.S | C.N |
|---|-------|-----|-----|
| $[\text{Co}(\text{H}_2\text{O})_6]^{3+}$ | | | |
| $[\text{Fe}(\text{CN})_6]^{3-}$ | | | |
| $\text{Na}_2[\text{Fe}(\text{CN})_5\text{NO}]2\text{H}_2\text{O}$ | | | |
| $[\text{Fe}(\text{CO})_5]$ | | | |

| Structures | Names | O.S | C.N |
|--|-------|-----|-----|
| $[\text{Cu}(\text{NH}_3)_4]^{2+}$ | | | |
| $[\text{Cr}(\text{H}_2\text{O})_4(\text{NH}_3)_2]^{3+}$ | | | |
| $[\text{Pt}(\text{NH}_3)_2\text{NO}_2\text{Cl}]^{2+}$ | | | |
| $[\text{Co}(\text{NH}_3)_5\text{SO}_4]\text{Br}$ | | | |
| $[\text{Cu}(\text{NH}_3)_4(\text{H}_2\text{O})]\text{SO}_4$ | | | |
| $[\text{Cr}(\text{H}_2\text{O})_6]\text{Cl}$ | | | |
| $[\text{Co}(\text{NH}_2\text{CH}_2\text{CH}_2\text{NH}_2)_3]\text{Cl}_3$ | | | |
| $[\text{Cu}(\text{CN})_4]^{3-}$ | | | |
| $[\text{Cu}(\text{NH}_3)_2(\text{H}_2\text{O})_2]^{2+}$ | | | |
| $[\text{Co}(\text{NH}_3)_6]^{3+}$ | | | |
| $[\text{SiF}_6]^{2-}$ | | | |
| $[\text{SnCl}_6]^{2-}$ | | | |
| H_2SiF_6 | | | |
| $[\text{Fe}(\text{CN})_5\text{NO}]^-$ | | | |
| $[\text{Pt}(\text{NH}_3)(\text{NO}_2)\text{Cl}]^{2+}$ | | | |
| $[\text{CrCl}_2(\text{H}_2\text{O})]^+$ | | | |
| $[\text{Co}(\text{NH}_3)_5\text{Br}]^{2+}\text{SO}_4^{2-}$ | | | |
| $[\text{Co}(\text{NH}_3)_5\text{SO}_4]^+\text{Br}^-$ | | | |
| $[\text{Ni}(\text{NH}_3)_6]^{2+}$ | | | |
| $[\text{Ag}(\text{NH}_3)_2]^+$ | | | |
| $[\text{Cu}(\text{H}_2\text{O})_4]^{2+}$ | | | |
| Al_4^- | | | |
| $[\text{Fe}(\text{CN})_6]^{2+}$ | | | |
| $[\text{Fe}(\text{CN})_6]^{4-}$ | | | |
| $[\text{Zn}(\text{NH}_3)_4]^{2+}$ | | | |
| $[\text{Zn}(\text{OH})_4]^{2-}$ | | | |
| $[\text{Zn}(\text{CN})_4]^{2-}$ | | | |
| $[\text{Zn}(\text{H}_2\text{O})_6]^{2+}$ | | | |
| $[\text{Cu}(\text{H}_2\text{O})_6]^{2+}$ | | | |
| $[\text{Cu}(\text{NH}_3)_2]^+$ | | | |
| $[\text{CuCl}_4]^{2-}$ | | | |
| $[\text{NiCl}_4]^{2-}$ | | | |
| $[\text{Ni}(\text{H}_2\text{O})_6]^{2+}$ | | | |
| $[\text{Co}(\text{H}_2\text{O})_6]^{2+}$ | | | |
| $[\text{Co}(\text{CN})_6]^{3-}$ | | | |
| $\text{Na}_3[\text{Co}(\text{NO}_2)_6]$ | | | |
| $\text{K}_3[\text{Co}(\text{NO}_2)_6]$ | | | |
| $[\text{CoCl}_4]^{2-}$ | | | |
| $[\text{Co}(\text{CN})_6]^{3-}$ | | | |
| $[\text{Co}(\text{NH}_3)_6]^{2+}$ | | | |

END SUCCESS