1. (a) CO doesn't have a vacant d-orbital.

2. (d) $\underbrace{HClO_4 + H_2O \rightleftharpoons H_3O^+ + ClO_4^-}_{\text{Conjugate acid and base pair}}$

3. (a) $FeCl_3 + 3H_2O \rightleftharpoons Fe(OH)_3 + 3HCl$. Strong acid and weak base.

4. (c) $Na_2CO_3 + 2H_2O \rightleftharpoons 2NaOH + H_2CO_3$

5. (b) Those substance accept the proton are called Bronsted base and which is donate the proton are called Bronsted acid.

   $HCO_3^- + H^+ \rightleftharpoons H_2CO_3$ Bronsted base.

   $HCO_3^- \rightleftharpoons H^+ + CO_3^{--}$ Bronsted acid.

6. (d) Is an electron pair acceptor

7. (b) The value of pK_a for strong acid is less.

8. (c) Because it is a salt of strong base and weak acid.

9. (b) Because it is conjugate base of weak acid.

   $CH_3COOH \rightleftharpoons CH_3COO^- + H^+$.

10. (d) Both (a) and (c)

    Explanation (Simple & Clear):
    NaOH (Sodium hydroxide) is a **strong base** because:
    It ionizes completely in water (easy ionization) →
    $NaOH \rightarrow Na^+ + OH^-$

It gives OH^- ions in solution, which makes the solution strongly basic.

11. (a) Those compound which accept $H^+$is called bronstad base NO_3^-accept H^+ and form HNO_3. So it is a base.

12. **(c) NH_3**

Explanation (Simple & Clear):
Proton affinity means **how strongly a substance can accept a proton (H^+).**
Higher electron density & stronger lone pair → higher proton affinity.
NH_3 (Ammonia) has:
A **small nitrogen atom**
A **high electron density**
A **strong lone pair → easily accepts a proton**
Thus → **$NH_3 + H^+ \rightarrow NH_4^+$ (stable)**

13. (a) Larger the size of halogen atom less is the back donation of electrons into empty $2p$ orbital of B.

14. (d) $H_2O + NH_3 \rightleftharpoons NH_4^+ + OH^-$

15. **(d) C_2H_4**

Explanation:
A **Lewis acid** is a substance that **accepts an electron pair**.

16. (b) $NH_2^- \rightleftharpoons NH^{-2} + H^+$

Conjugate acid, base pair.

17. (b) Those substances which lose proton are called acid.

e.g. strong acid have a strong tendency to donate a proton.

18. (d) Electron donating species called nucleophile. NH_3 have a lone pair of electron.

19. (a) H_2Oacts as acid as it provides $H^+$to NH_3.

20. (b) $CH_3COOH + HF \rightleftharpoons CH_3COOH_2^+ + F^-$. HF gives H^+ to the CH_3COOH. So it is a conjugate base of *HF*.