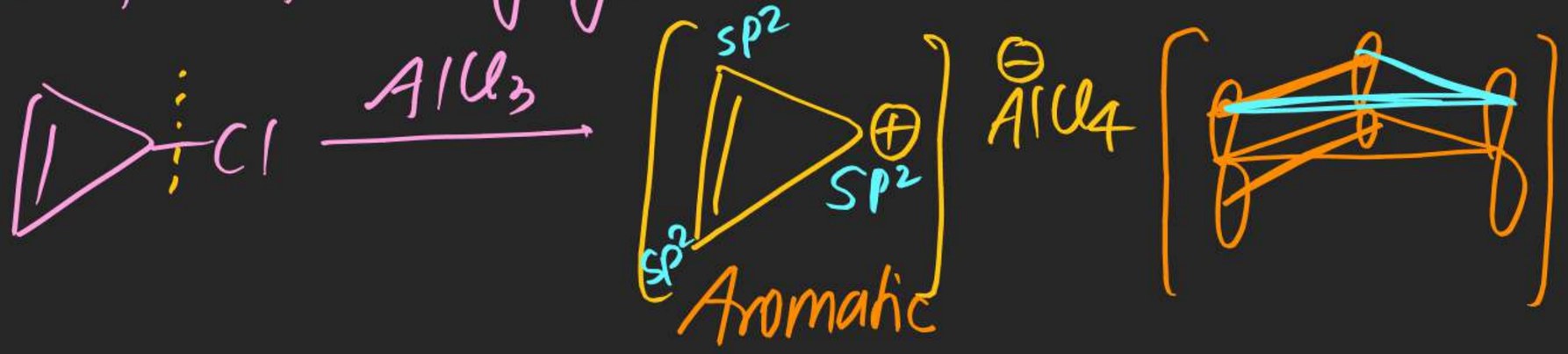
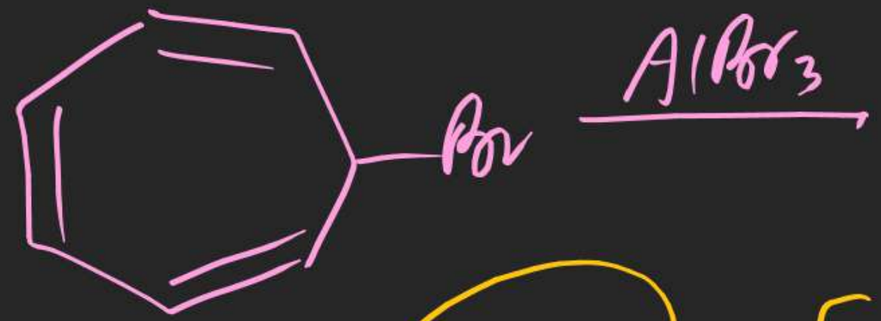
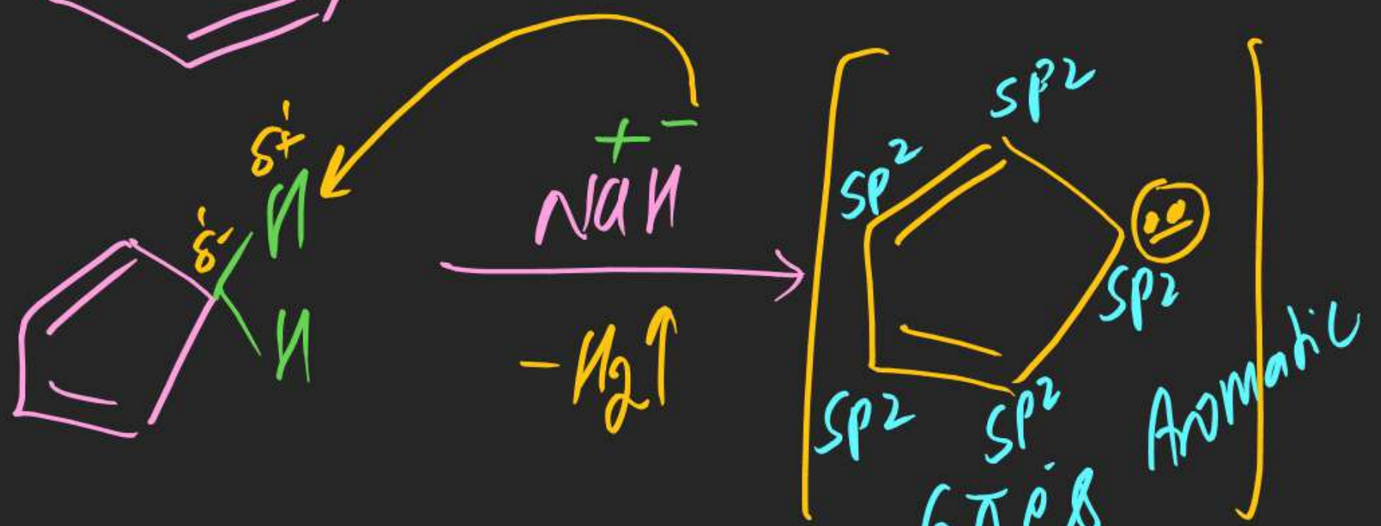
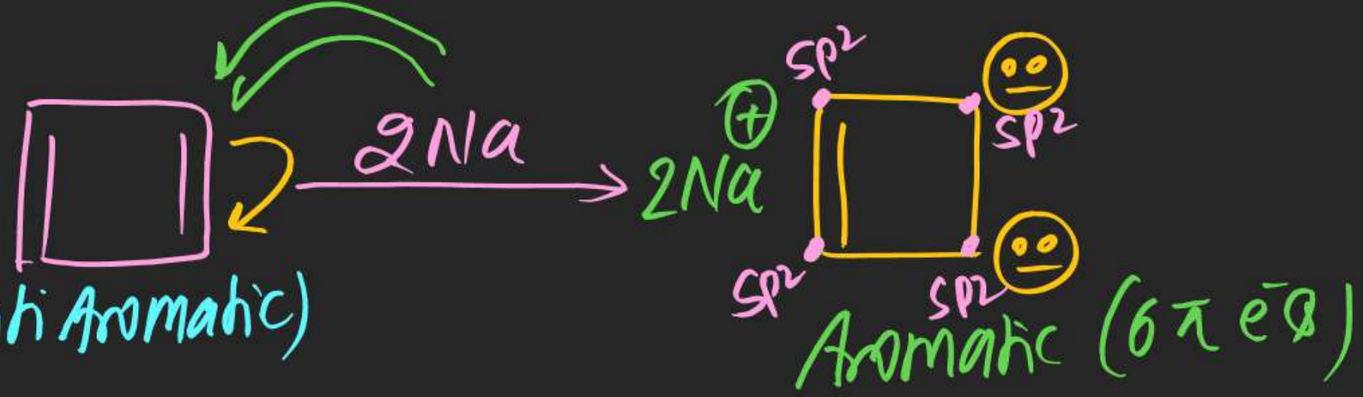
Which of the following gives Aromatic Product

(57) 

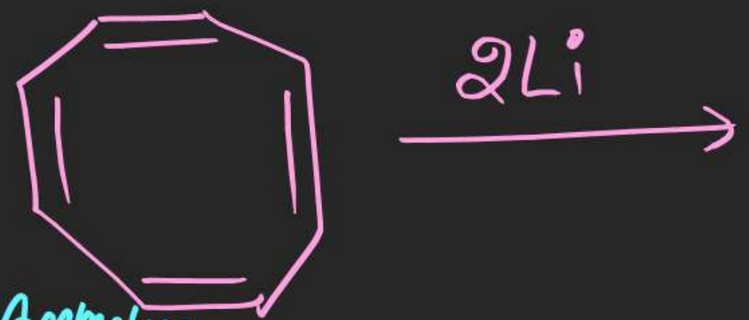
(58) 

(59) 

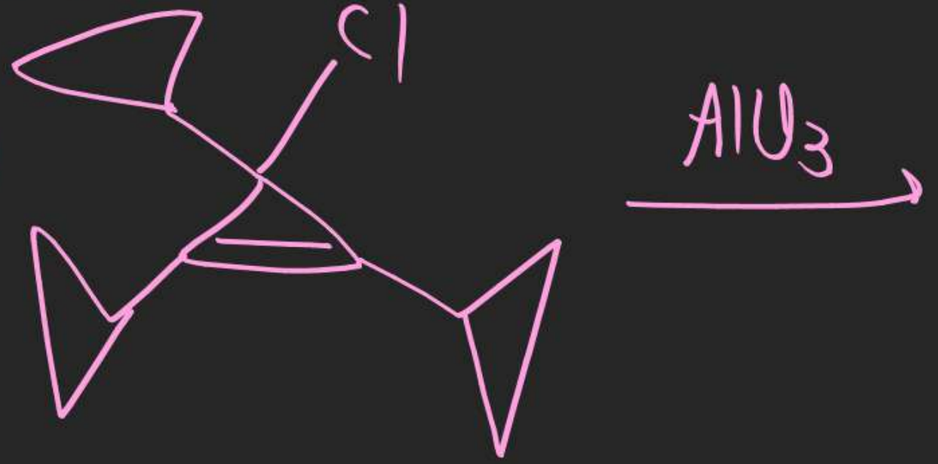
(60)


2Na
2Na⊕
sp²
sp²
sp²
sp²
(Anti Aromatic)
Aromatic (6π e⊖)

(61)

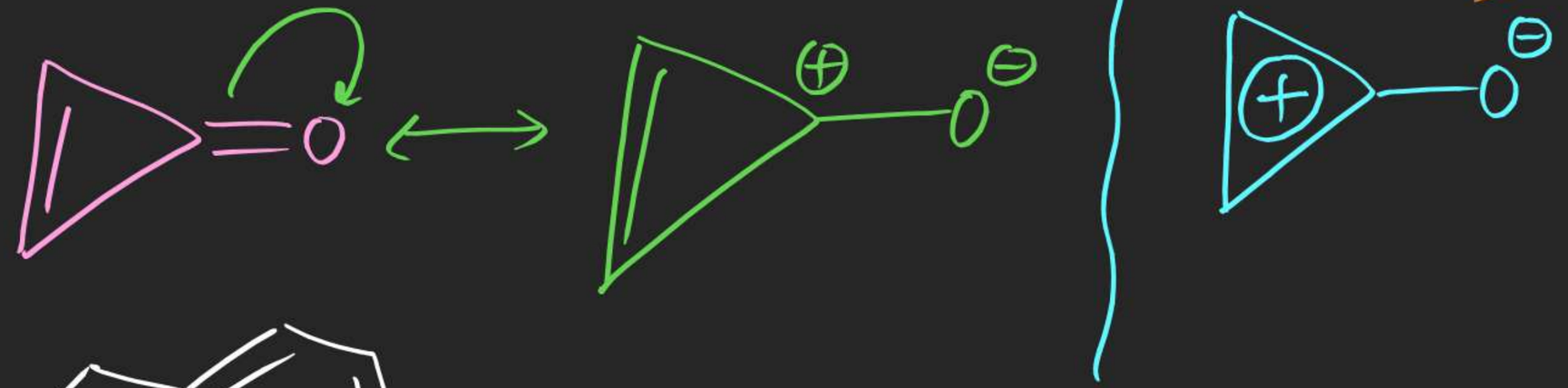

2Li
8π e⊖
(Non Aromatic)

(62)

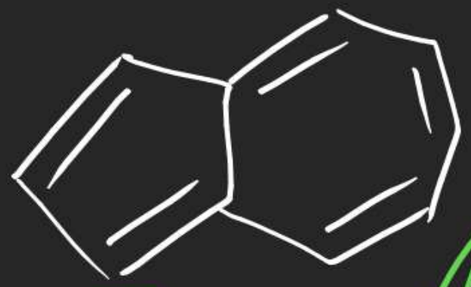

Cl
AlU3

(#) Predict direction of dipole moment

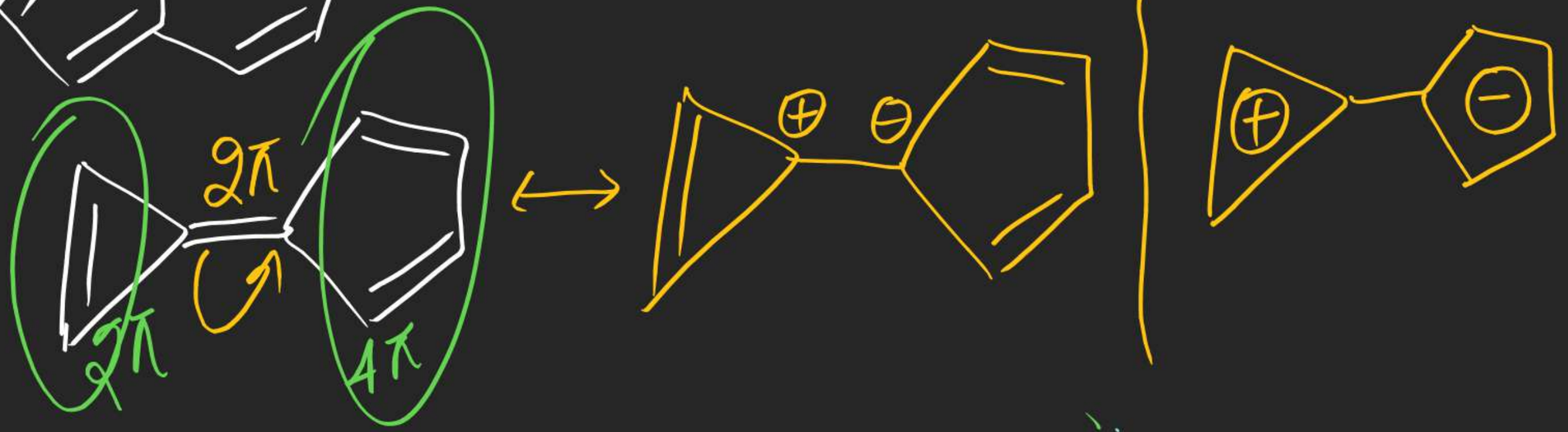
(63)

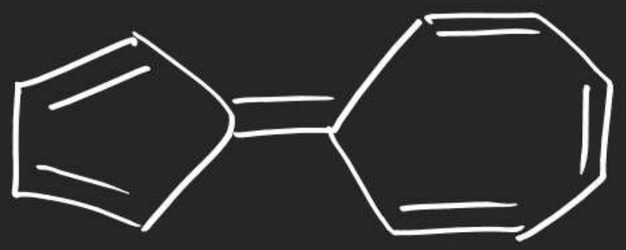


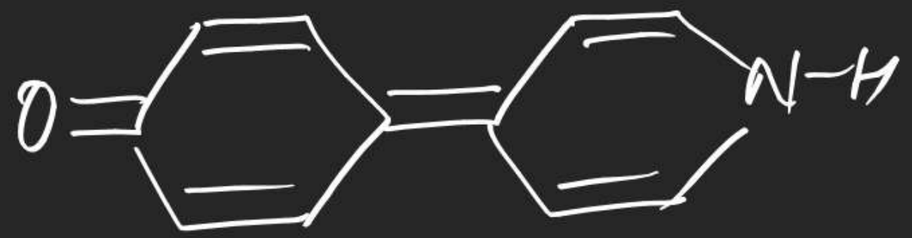
(64)

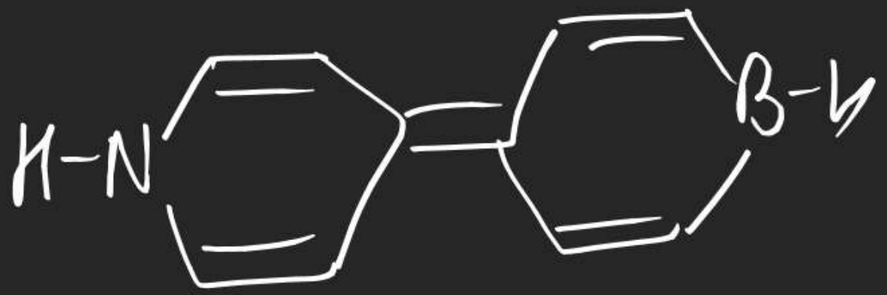


(65)



(66) 

(67) 

(68) 

Acid & Base

Arhenius Theory:- Acids are substances which give H^+ ion in aq. soln whereas Bases are substances which give $\bar{O}H$ ion in aq. soln.

$$\text{Acid} \longrightarrow H^{\oplus}_{(aq)}$$

$$\text{Base} \longrightarrow \overset{\ominus}{O}H_{(aq)}$$

Ex: $H\text{-}Cl_{(aq)} \longrightarrow H^{\oplus}_{(aq)} + \overset{\ominus}{Cl}_{(aq)}$

Ex: $NaOH_{(aq)} \longrightarrow Na^{\oplus}_{(aq)} + \overset{\ominus}{O}H_{(aq)}$

Bronsted & Lowery: Acc. to this theory Acids are proton donar whereas Bases are proton acceptor.

Acid ⟶ $H^{\oplus}$ donar

Base ⟵ $H^{\oplus}$ acceptor

Ex: Acid $HCl \longrightarrow H^{\oplus} + Cl^{\ominus}$

Ex: Base $NH_3 + H^{\oplus} \longrightarrow NH_4^{\oplus}$

Lewis Theory Acc. to this theory Acids are $\bar{e}$ pair acceptors & Bases are $\bar{e}$ pair donars.

Acid ⟵ $\bar{e}$ pair acceptor

Base ⟶ $\bar{e}$ pair donar

Ex: $AlCl_3 + Cl^{\ominus} \longrightarrow AlCl_4^{\ominus}$

Ex: $H_3N + H^{\oplus} \longrightarrow NH_4^{\oplus}$

⇒ Let us Consider Acid HA & $\ddot{B}$

$$HA \rightleftharpoons H^{\oplus} + A^{\ominus}$$

HA: Acid, Strong; $H^{\oplus}$ + $A^{\ominus}$: Conjugate Base

$$K_a = \frac{[H^{\oplus}][A^-]}{[HA]} \longrightarrow (i)$$

$$\ddot{B} + H^{\oplus} \rightleftharpoons \overset{\oplus}{B}H$$

$\ddot{B}$: Base; $\overset{\oplus}{B}H$: Conjugate Acid

$$K_b = \frac{[\overset{\oplus}{B}H]}{[B][H^+]} \longrightarrow (ii)$$

Acidic strength of HA $\propto$ Stability of $A^{\ominus}$

$\propto$ EWG

$\propto K_a \propto \frac{1}{pK_a}$

Basic strength of $\ddot{B}$ $\propto$ Stability of $\overset{\oplus}{B}H$

$\propto$ EDG

$\propto K_b \propto \frac{1}{pK_b}$

Note (i) Deprotonation generates Conjugate Base

(ii) Protonation generates Conjugate Acid.

(iii) A strong Acid & strong Base is relatively unstable in nature

(iv) A weak Acid & weak Base is relatively stable in nature.

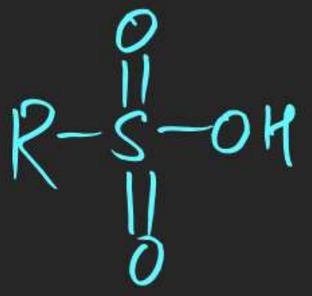
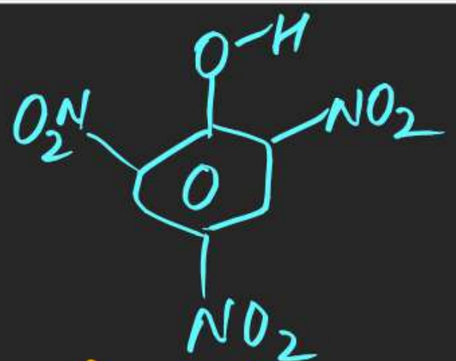
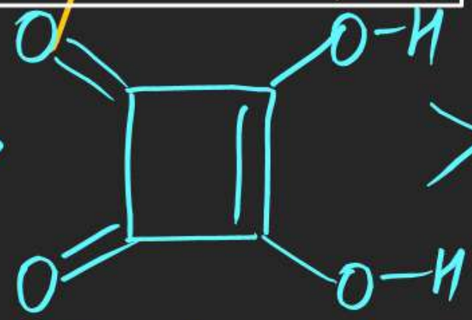
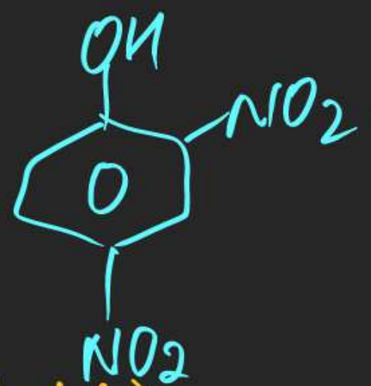
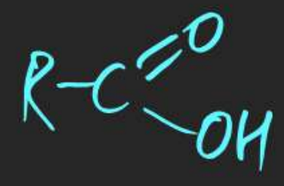
(v) Stryer Acid Contains weaker conjugate Base & vice versa.
unstable → Stable

(vi) Stryer Base Contains weaker conjugate Acid & vice versa.
unstable stable

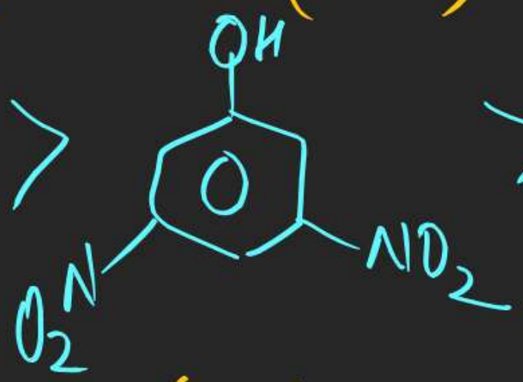
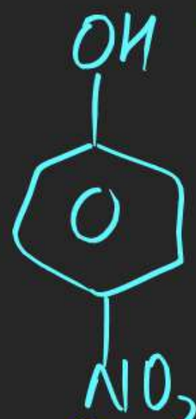
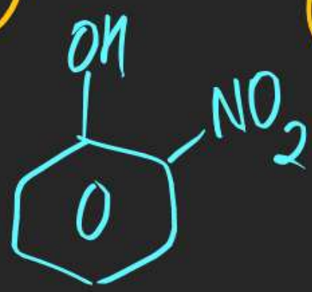
MIMP
(vii) Each Acid Base Reaction moves towards weaker Acid / weaker Base side.
stable stable

(viii) $pH = -\log[H^+]$ | $pK_a = -\log K_a$ | $pK_b = -\log K_b$

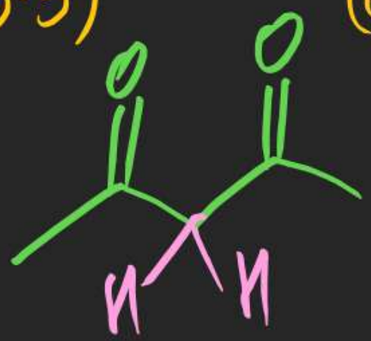
most important Acidic strength order

(a)  >  >  >  > 

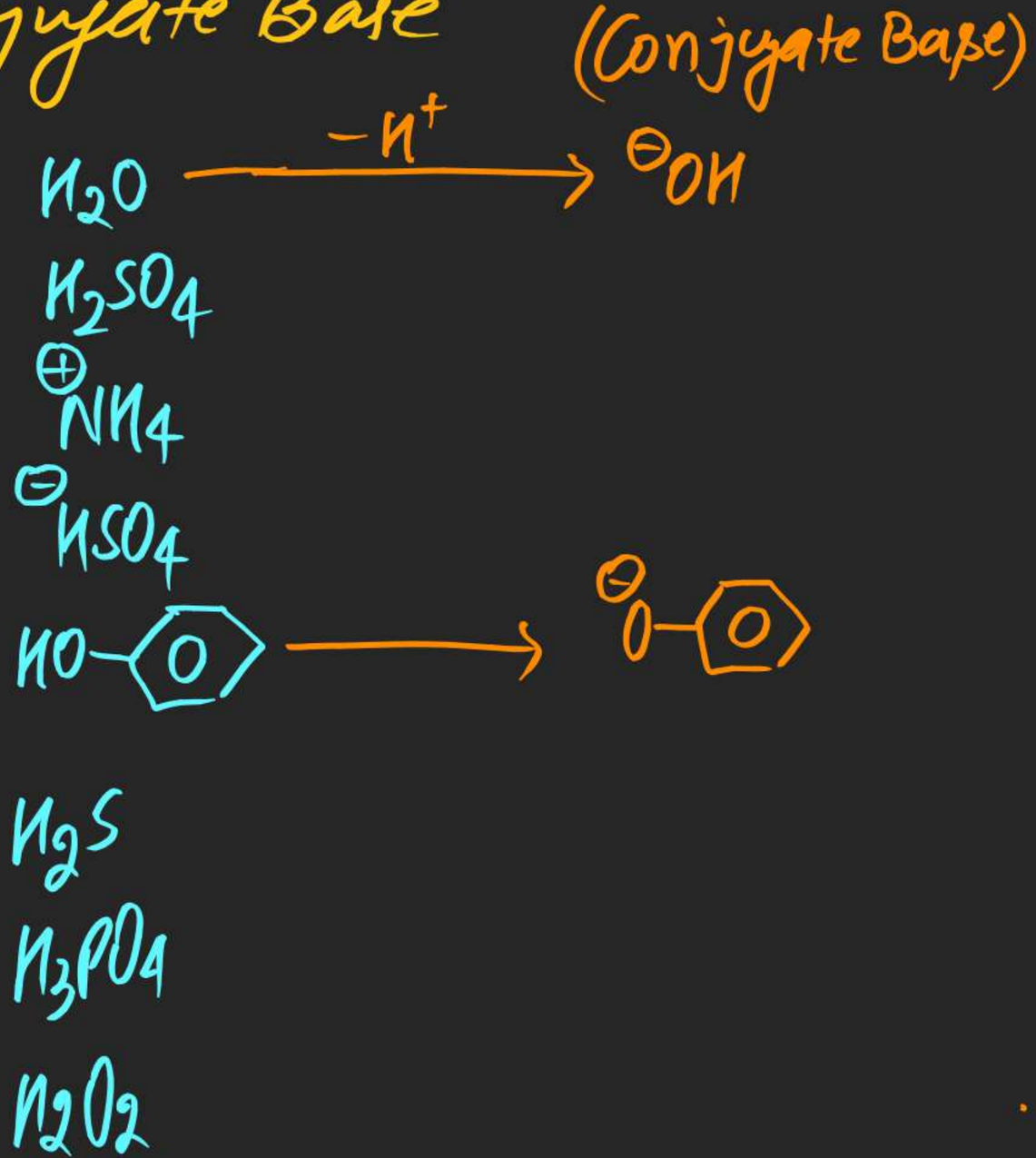
pKa (-7) (0.42) (1.5) (4.11) (4.18)

> H_2CO_3 >  >  >  >  > H_2O > 

(6.3) (6.7) (7.1) (7.2) (10) (15) (16)

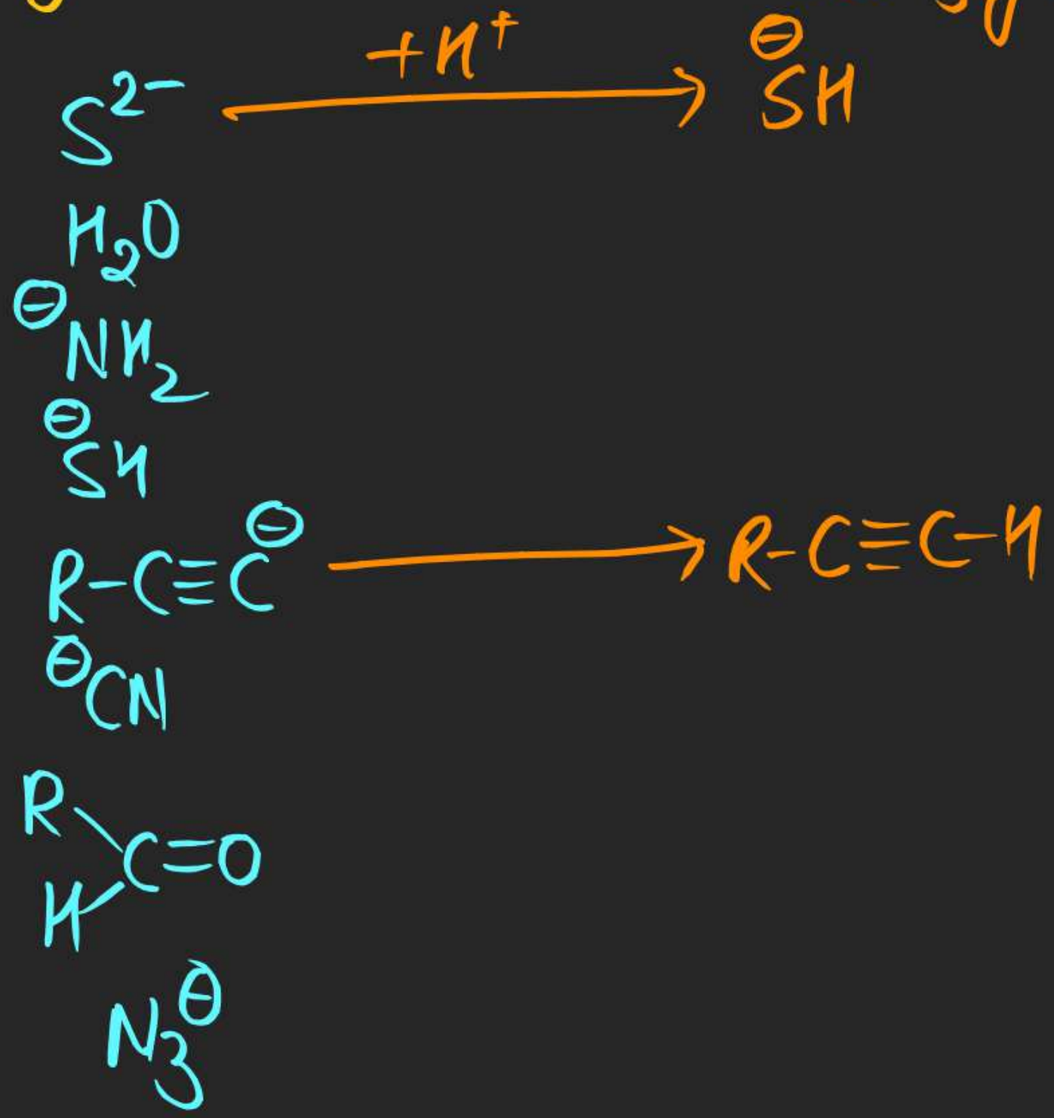
(b)  > H_2O > R-OH > R-C≡C-H > NH_3 > H_2

(1) write Conjugate Base



(2) Write Conjugate Acid of following

Conjugate Acid



(3) Which of the following reaction is feasible / spontaneous / is moving in forward reaction.

(a) (WA) $R-C\equiv C^{\delta-}-H^{\delta+}$ + $K^{+}OH^{-}$ (Acid, Base) $\not\longrightarrow$ $R-C\equiv C^{\ominus}K^{\oplus}$ + H_2O (SA) Not Feasible

(b) (WA) $R-C\equiv C-H$ + $NaOH$ $\not\longrightarrow$ $R-C\equiv C^{\ominus}Na^{\oplus}$ + H_2O (SA) Not Feasible

(c) (SA) $R-C\equiv C^{\delta-}-H^{\delta+}$ + $Na^{+}H^{-}$ $\longrightarrow$ $R-C\equiv C^{\ominus}Na^{\oplus}$ + H_2 (WA) (Feasible)

(d) $R-C\equiv C-H$ + $NaNH_2$ $\longrightarrow$

(e) $R-C\equiv C-H$ + $NaHCO_3$ $\longrightarrow$

(f) $R-C\equiv C-H$ + Na $\longrightarrow$

HW
sheet Ex-1 (1-25)