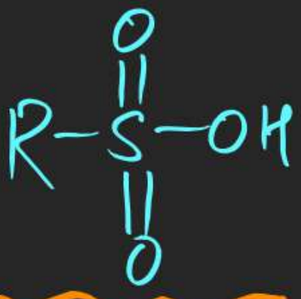
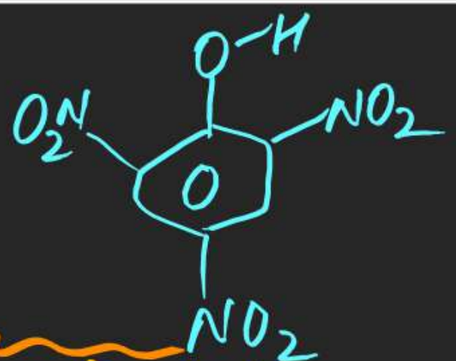
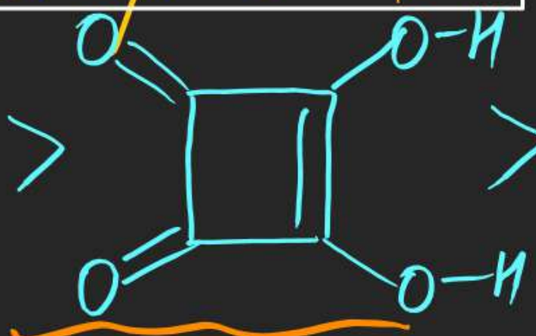
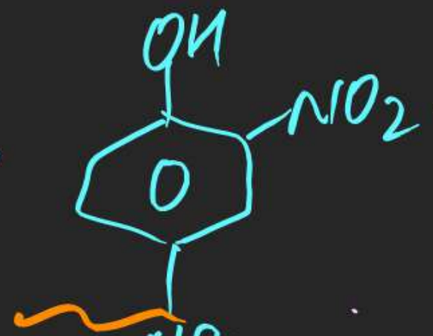
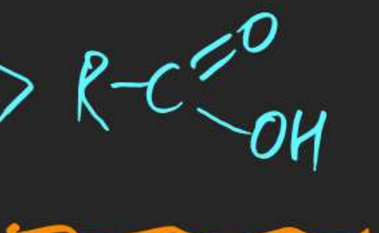
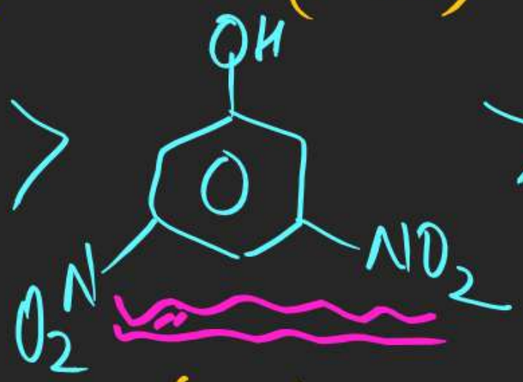
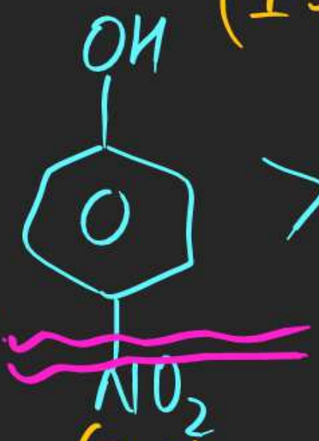
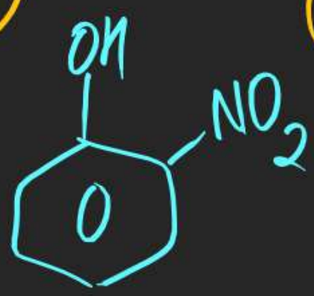
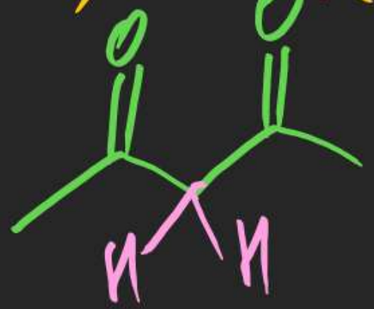
most important Acidic strength order

(a)  >  >  >  > 

pKa (−7) (0.42) (1.5) (4.11) (4.18)

> H_2CO_3 >  >  >  >  > H_2O > 

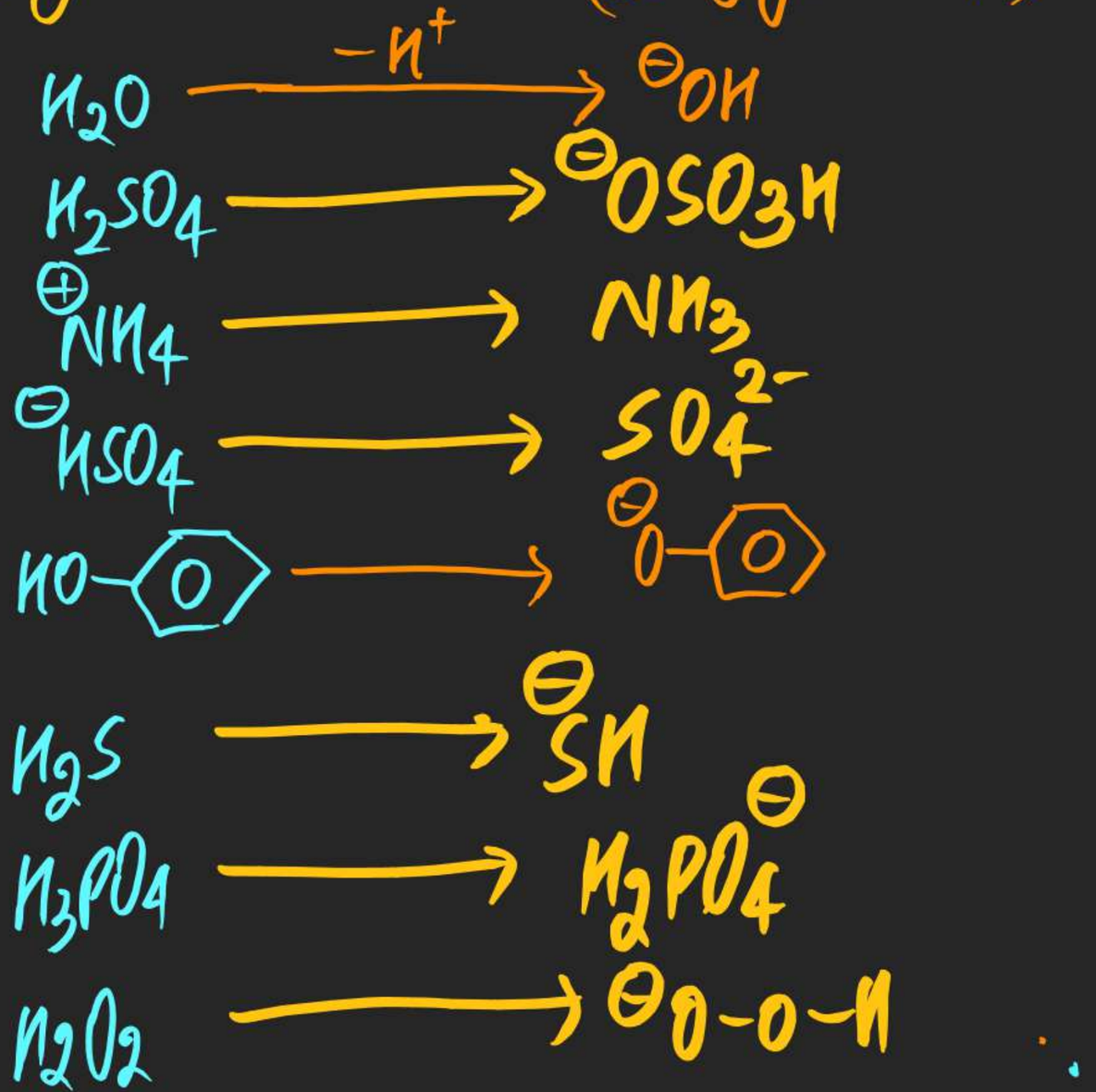
(6.3) (6.7) (7.1) (7.2) (10) (15) (16)

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

Nishant Jindal

(1) write Conjugate Base

(Conjugate Base)



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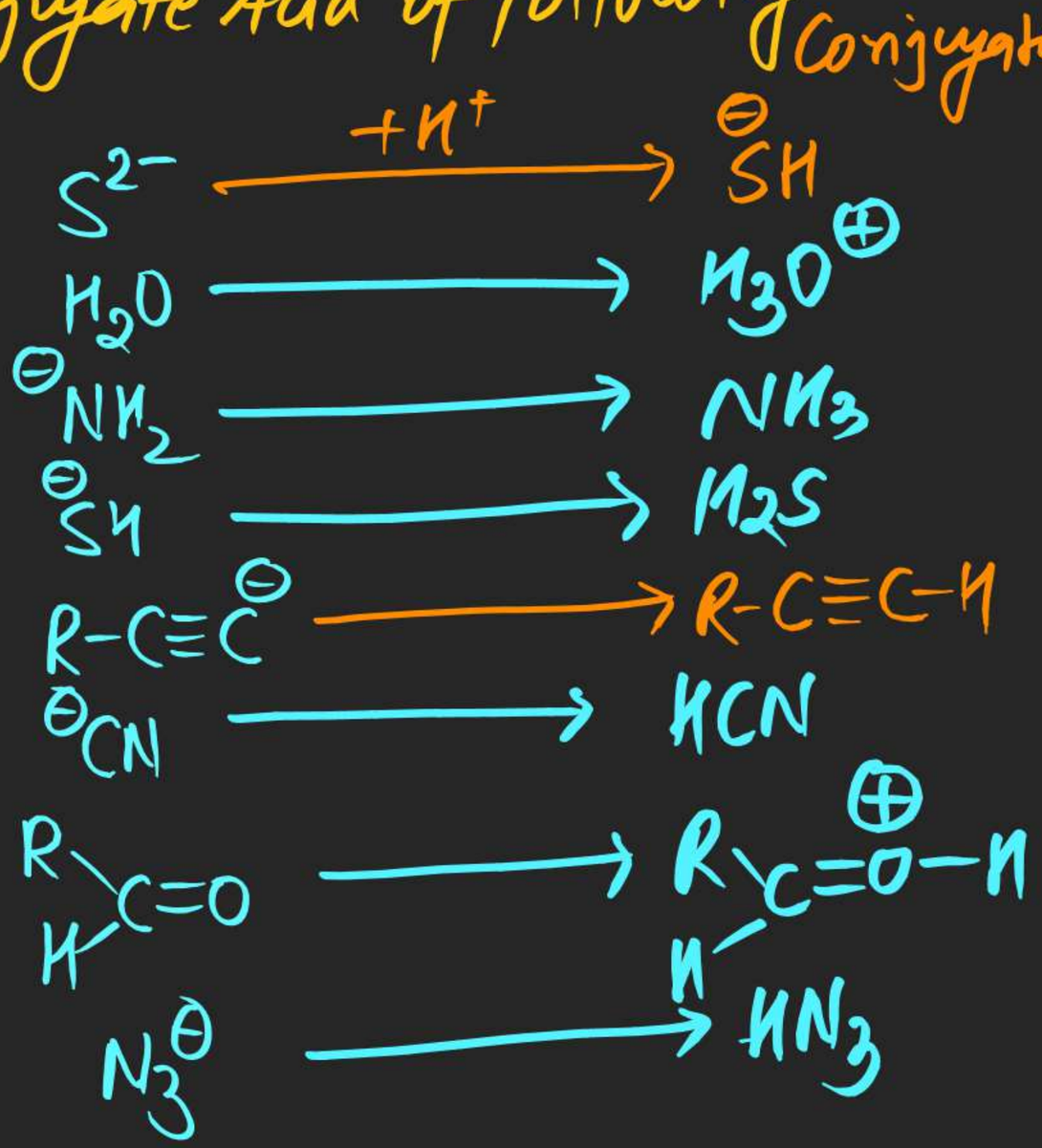
(2) Write Conjugate Acid of following



Nishant Jindal

(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^- ⟶✗ $R-C\equiv C^{\ominus}K^{\oplus}$ + H_2O (SA) Not Feasible

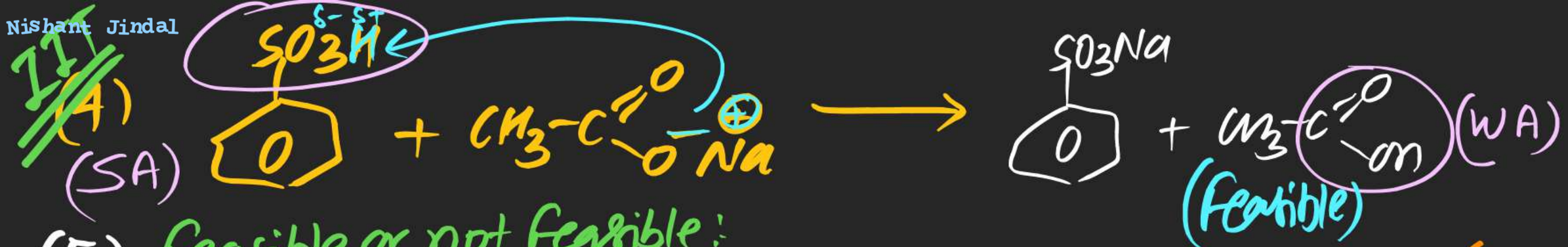
(b) (WA) $R-C\equiv C-H$ + $NaOH$ ⟶✗ $R-C\equiv C^{\ominus}Na^{\oplus}$ + H_2O (SA) Not Feasible

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

(d) (SA) $R-C\equiv C-H$ + $Na^+\bar{N}H_2$ ⟶✓ $R-C\equiv C^{\ominus}Na^{\oplus}$ + NH_3 (WA)

(e) (WA) $R-C\equiv C-H$ + $Na^+HCO_3^-$ ⟶✗ $R-C\equiv C^-Na^+$ + H_2CO_3 (SA)

(f) (SA) $R-C\equiv C-H$ + $Na^+e^{\ominus}$ ⟶✓ $R-C\equiv CNa^{\oplus}$ + $\frac{1}{2}H_2$ (WA)



(5) Feasible or not feasible :

(a) $R-C\equiv C^{\ominus}\,Na^{\oplus} + H_2CO_3 \longrightarrow R-C\equiv C-H + NaHCO_3$ (Feasible)

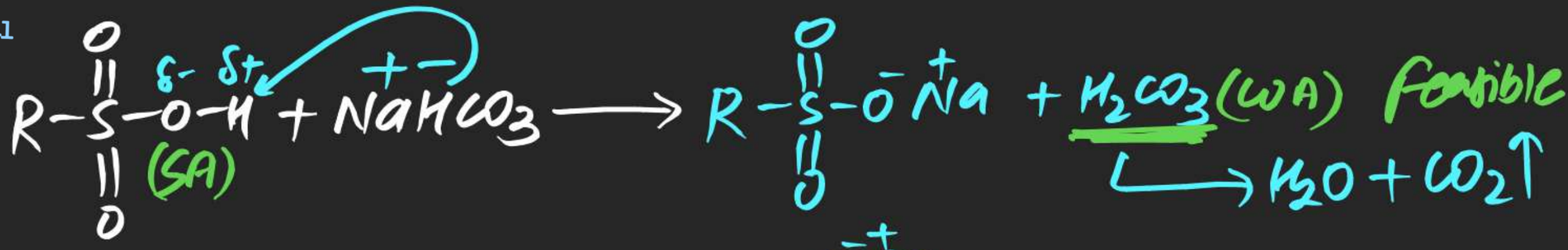
SA → WA

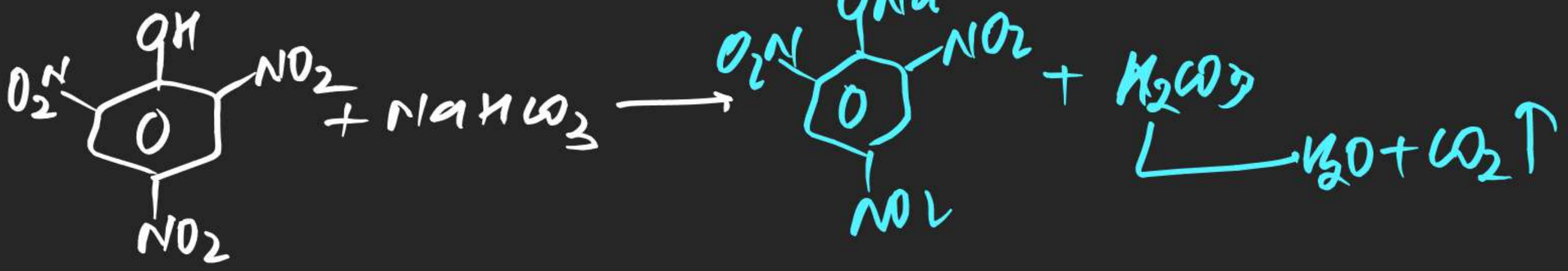
(b) $R-C\equiv C^{\ominus}\,Na^{\oplus} + H_2O \longrightarrow R-C\equiv C-H + NaOH$ (Feasible)

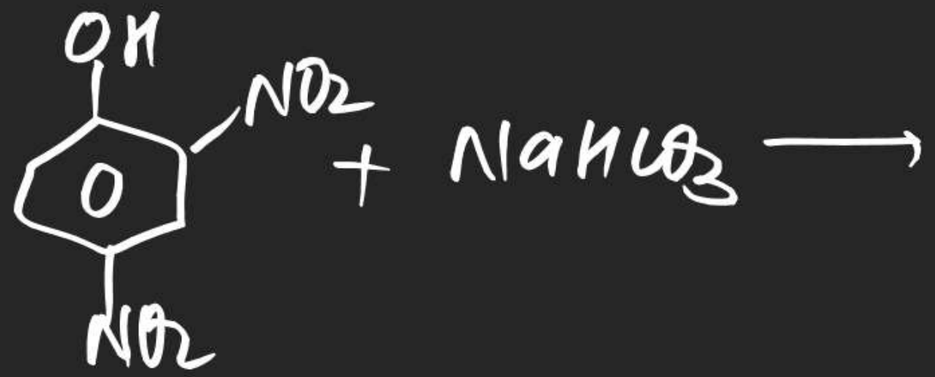
SA → WA

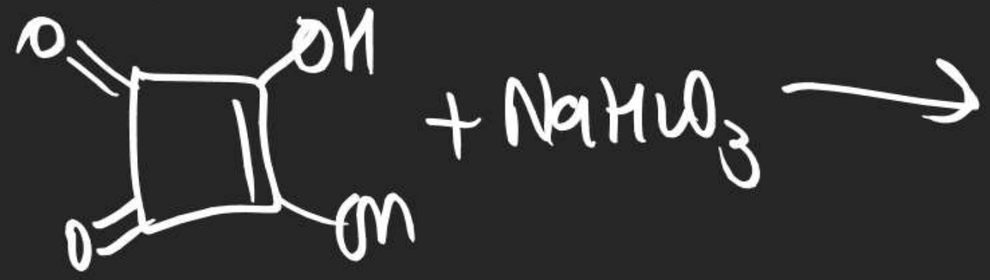
(#) Which of the following Reaction is Spontaneous / Feasible / moving in Forward direction / gives Brisk effervescence with Aq. $NaHCO_3$

Nishant Jindal

(7) 

(8) 

(9) 

(10) 

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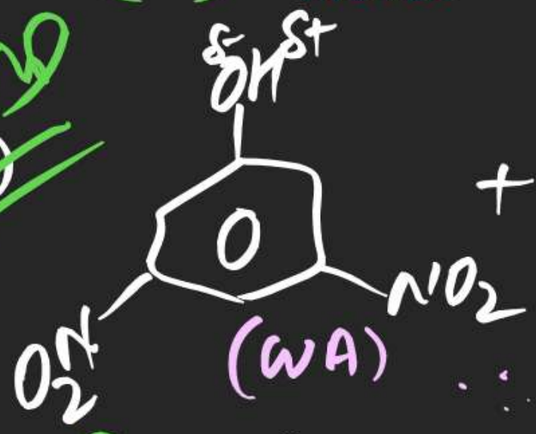
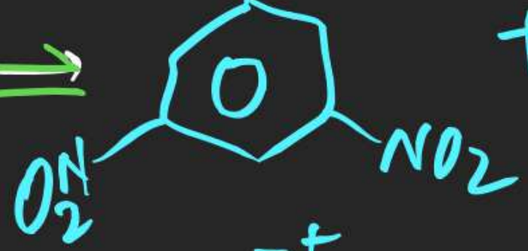
(11) $R-C(=O)-\overset{\delta}{O}-\overset{\delta+}{H}$ (SA) Acid + $NaHCO_3$ Base $\longrightarrow$ $R-C(=O)-O^-Na^+$ + H_2CO_3 (WA) $\longrightarrow$ $H_2O + CO_2\uparrow$ Gas (Feasible)

(12) (More Imp)

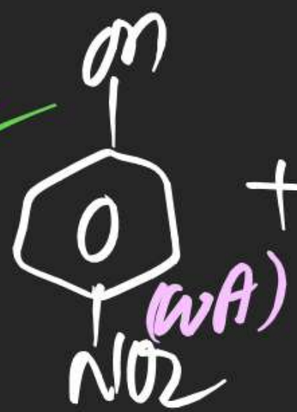


+ $NaHCO_3$ $\rightleftharpoons$



+ H_2CO_3 (SA) $\longrightarrow$ $H_2O + CO_2\uparrow$

(13) (More Imp)



+ $NaHCO_3$ $\rightleftharpoons$

+ H_2CO_3 (SA) $\longrightarrow$ $H_2O + CO_2\uparrow$

(14)  + $NaHCO_3$ $\longrightarrow$ Not Feasible.

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गैस हमेशा बेस से निकलती है !

(15) 

$+ Na_2CO_3 \longrightarrow$

IIT Adv

(16) Gases Evolved during following Reactions Respectively.

(i) $R-\overset{14}{C}(=O)-OH + NaHCO_3 \xrightarrow[\text{Base}]{} R-\overset{14}{C}O_2^-Na^+ + H_2CO_3$

(ii) $R-SO_3H + NaHCO_3 \xrightarrow[\text{Base}]{} R-SO_3^-Na^+ + H_2CO_3$

(A) CO_2, SO_3 (C) $\overset{14}{CO_2}, SO_2$ (E) $\overset{14}{CO_2}, \overset{14}{CO_2}$

(B) CO_2, SO_2 (D) $\overset{14}{CO_2}, SO_3$ (F) ✓ CO_2, CO_2

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(17) Which of the following shows unusually very high solubility in H_2O

(A) 

(B) 

(C) 

(D) 

(E) N.O.T

Soln: All these given compounds containg longer hydrophobic part so that they are soluble in ether not in H_2O.

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Solubility:- Interaction of solvent molecule with solute is known as Solubility

$\Rightarrow$ higher the interaction of solvent, higher wod be Solubility

Ex:

$R-\boxed{OH}$ Hydrophobic — Hydrophilic

$R-\boxed{NH_2}$ Hydrophobic — Hydrophilic

$R-\boxed{COOH}$ Hydrophobic — Hydrophilic

CH_3-OH	∞
CH_3-CH_2-OH	∞
$3C-OH$	1.2 gm/ml
$4C-OH$	1.3 gm/ml
$5C-OH$	negligible
$6C-OH$	!!

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Note (a) Compound with 5 or more than 5 Carbon Hydrophobic part is insoluble in H_2O

(b) Such Compounds with longer hydrophobic part & $\mu \neq 0$ are soluble in polar Organic Compound.

are soluble in Ether

Polar Organic Solvent

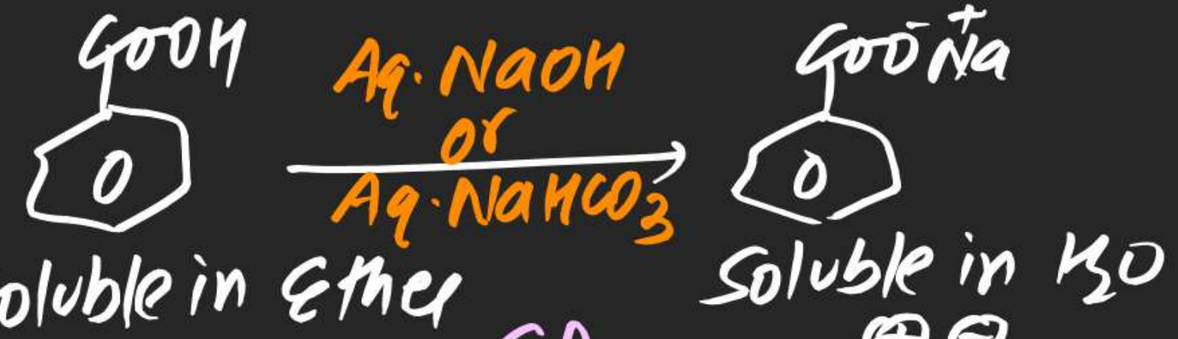
(C) Salt (ionic) is soluble in H_2O irrespective of hydrophobic part.

(i)

Soluble in Ether

Soluble in H_2O

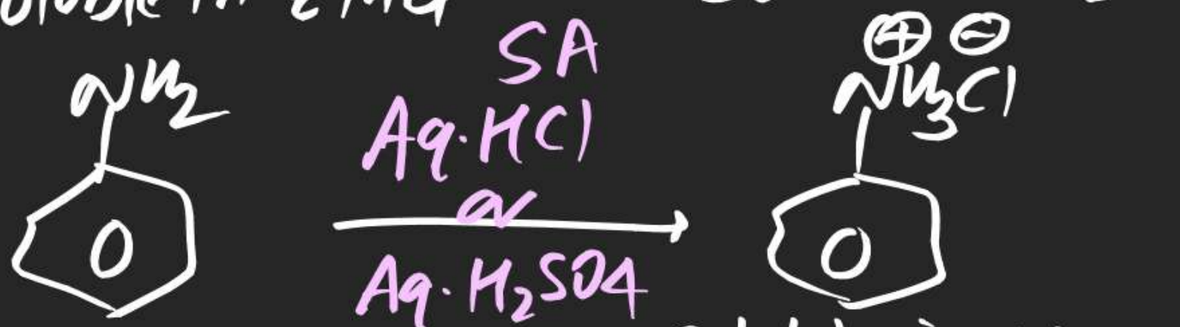
(ii)



Soluble in Ether

Soluble in H_2O

(iii)



Soluble in Ether

Soluble in H_2O

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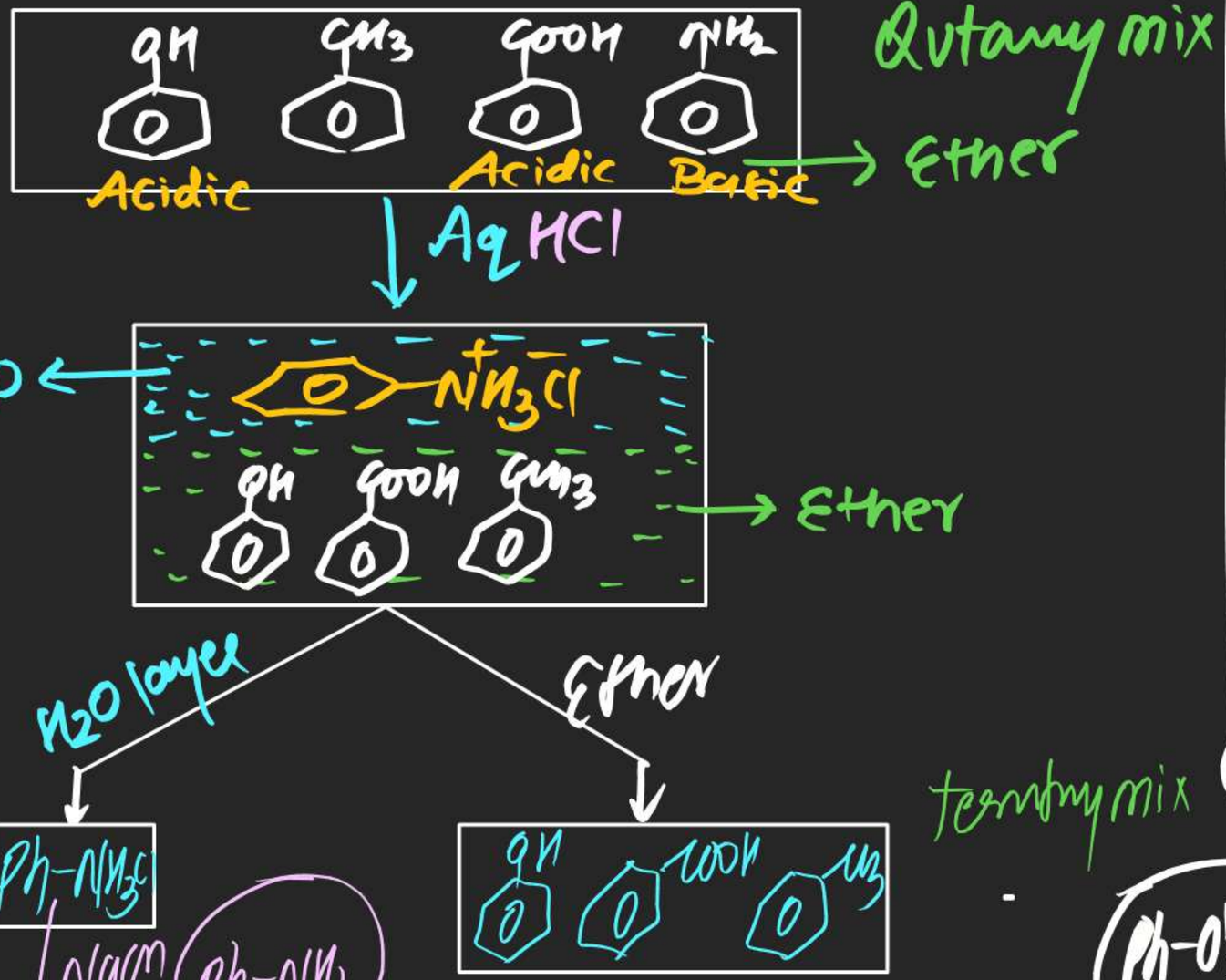
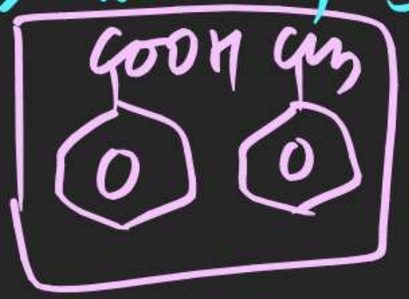
(1B) Separate following mixture By Acid-Base method.

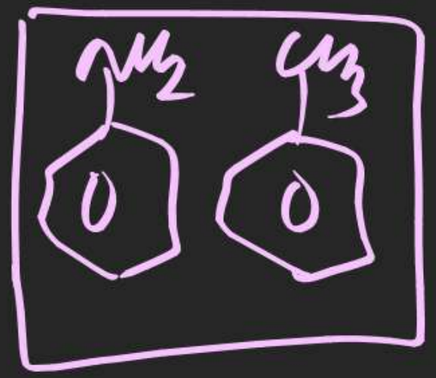


Sepration of Binary mixture

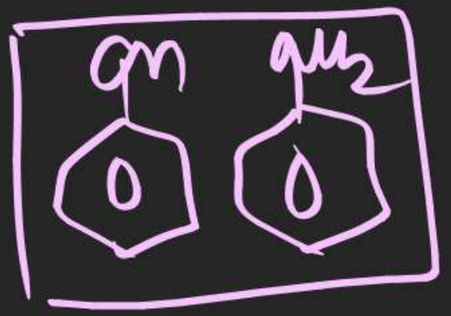
(19)



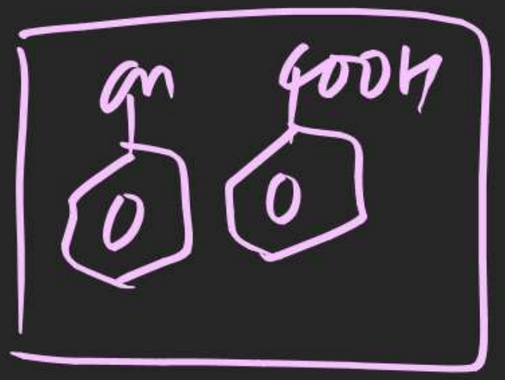
(20)



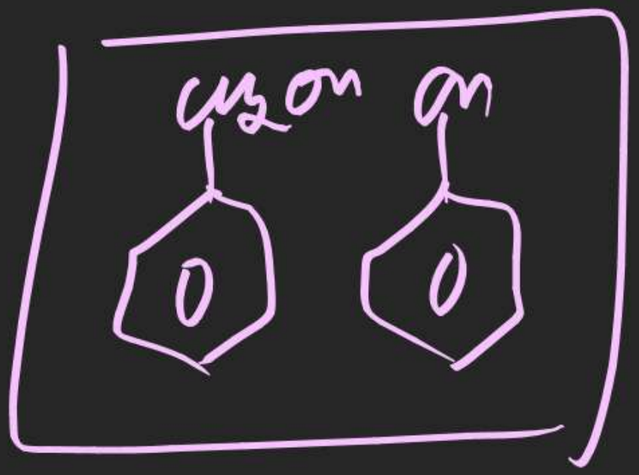
(21)



(22)



(23)



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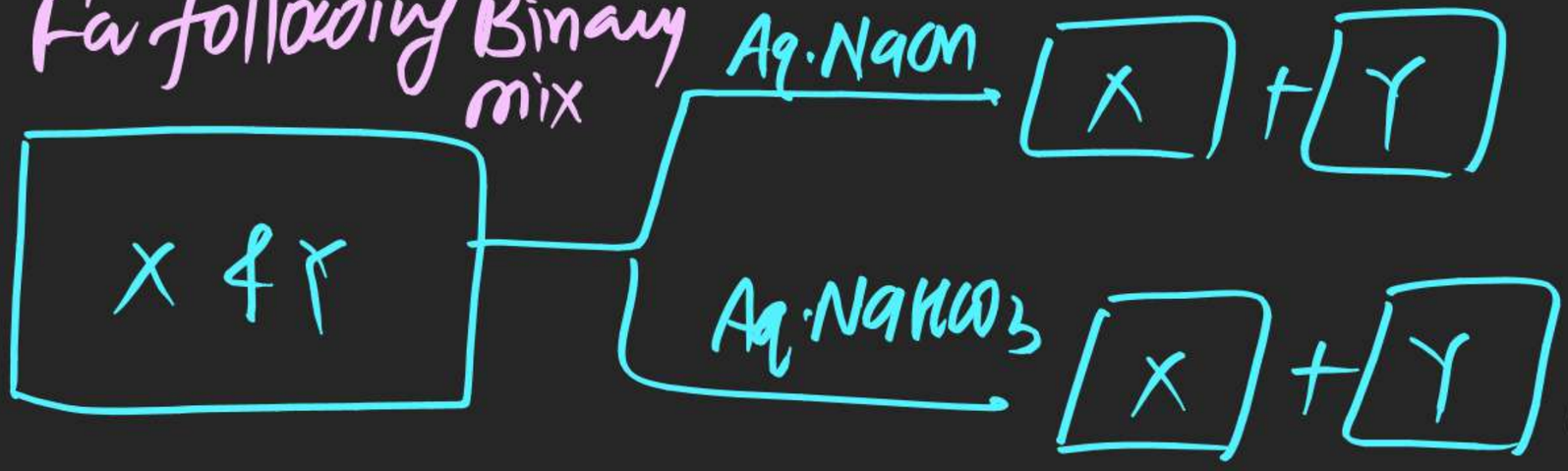
(24) Fa following Binary mix



Find X, Y.

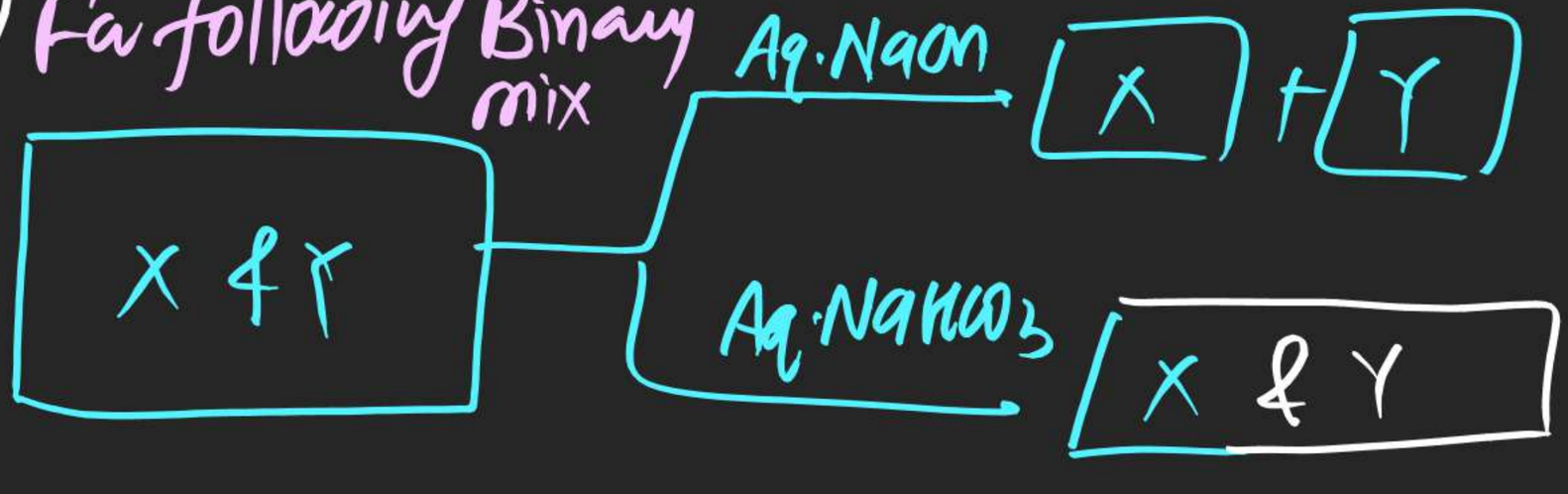
(A) Ph-OH, Ph-COOH

(B) Ph-OH, Ph-CH_2-OH

(C) Ph-CH_2-OH, Ph-COOH

(D) Ph-OH, Ph-CH_2-COO

(25) Fa following Binary mix



Find X, Y.

(A) Ph-OH, Ph-COOH

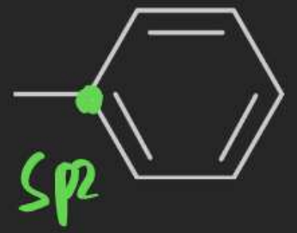
(B) Ph-OH, Ph-CH_2-OH

(C) Ph-CH_2-OH, Ph-COOH

(D) Ph-OH, Ph-CH_2-COO

sp^2 Carbon $-I$
sp Carbon $-I$
sp^3 Carbon $+I$

Q.3 **Which of the following groups have + I effect:**

(A) 

(B) 

(C) 

(D) $-CH = CH_2$
sp2

Q.6 Which of the following statements is (are) true about resonance.

(a) Resonance is an intramolecular process.

(b) Resonance involves delocalization of both σ and π electrons.

(c) Resonance involves delocalization of π electrons only.

(d) Resonance decreases potential energy of an acyclic molecule.

(e) Resonance has no effect on the potential energy of a molecule.

(f) Resonance is the only way to increase molecular stability.

(g) Resonance is not the only way to increase molecular stability.

(h) Any resonating molecule is always more stable than any non resonating molecule.

(i) The canonical structure explains all features of a molecule.

(j) The resonance hybrid explains all features of a molecule.

(k) Resonating structures are real and resonance hybrid is imaginary.

(1) Resonance hybrid is real and resonating structures are imaginary.

(m) Resonance hybrid is always more stable than all canonical structures.

PE ↓ Stability ↑

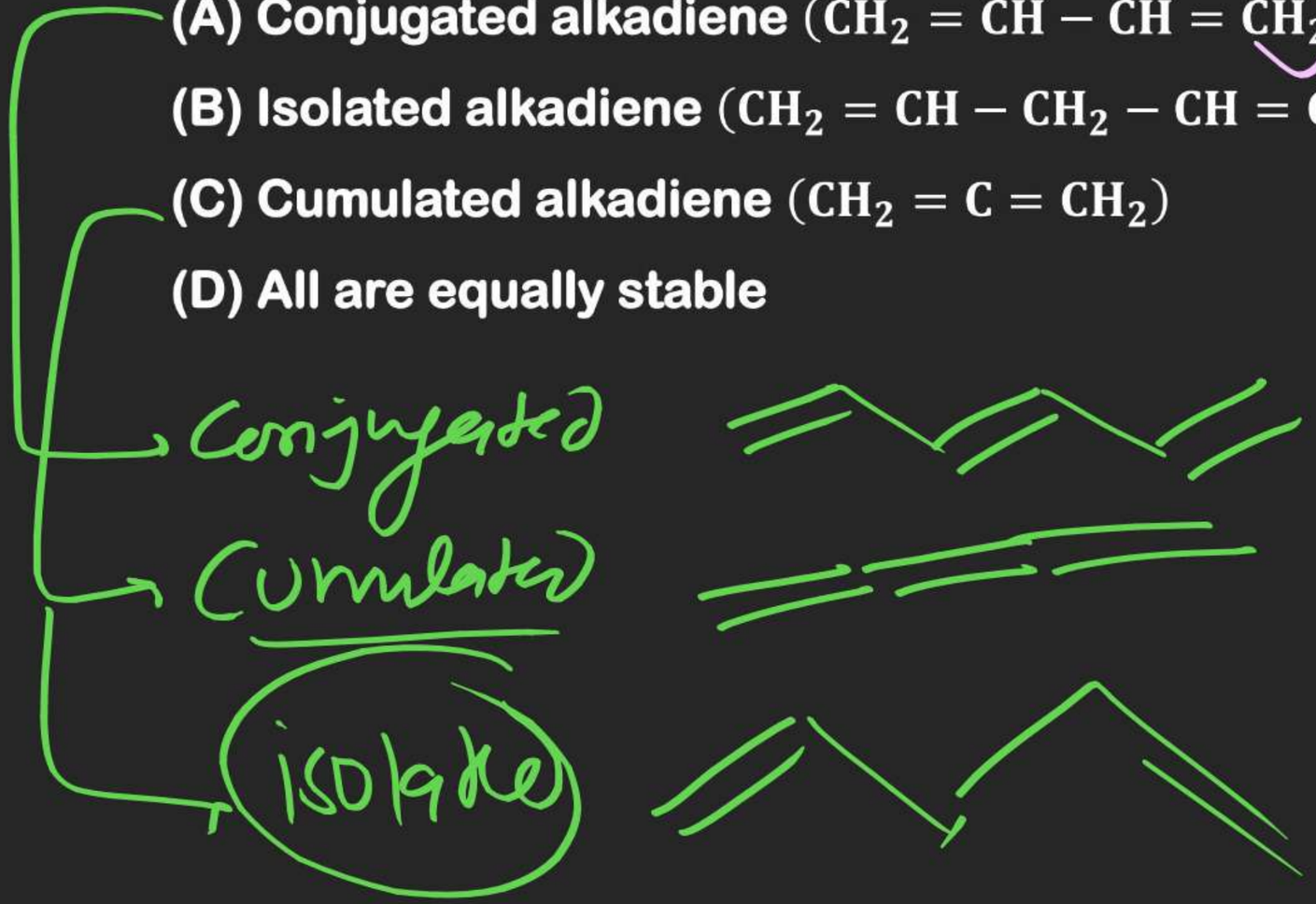
Q.8 Which of the following is most stable?

(A) Conjugated alkadiene $(CH_2 = CH - CH = CH_2)$ ✓ Resonance

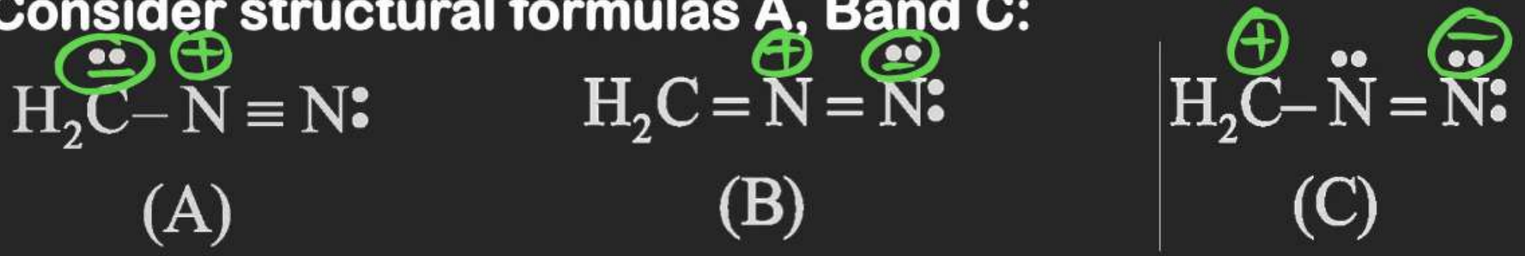
(B) Isolated alkadiene $(CH_2 = CH - CH_2 - CH = CH_2)$

(C) Cumulated alkadiene $(CH_2 = C = CH_2)$

(D) All are equally stable



Q.9 Consider structural formulas A, B and C:



(A) (B) (C)

(a) Are A, B and C isomers, or are they resonance forms?

(b) Which structures have a negatively charged carbon?

(c) Which structures have a positively charged carbon?

(d) Which structures have a positively charged nitrogen?

(e) Which structures have a negatively charged nitrogen?

(f) What is the net charge on each structure?

(g) Which is a more stable structure, A or B? Why?

(h) Which is a more stable structure, B or C? Why?

N ⇒ Neutral
3 Bond

N ⇒ 1 lonepair
Neutral

N ⇒ 2 lonepair
(−)

N ⇒ 4 Bond
(+)

Q.10 A canonical structure will be more stable if

(A) it involves cyclic delocalization of $(4n+2)\pi$-electrons than if it involves acyclic delocalization of $(4n+2)\pi$ - electrons.

(B) it involves cyclic delocalization ($4n)\pi$-electrons than if it involves acyclic delocalization of (4n) 7π-electrons.

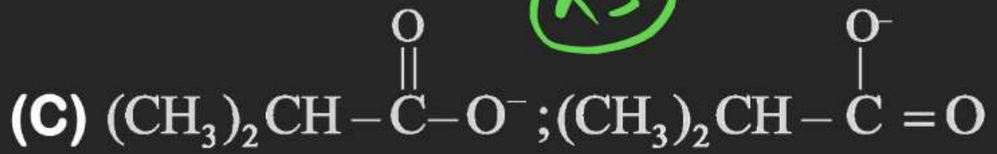
(C) +ve charge is on more electronegative atom than if +ve charge is on less electronegative atom provided atoms are in the same period.

(D) -ve charge is on more electronegative atom than if -ve charge is on less electronegative atom provided atoms are in the same period.

Q.11 Which one of the following pair of structures does not represent the phenomenon of resonance?

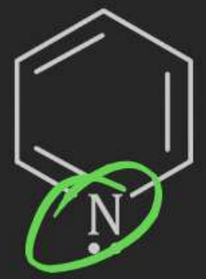
(A) 

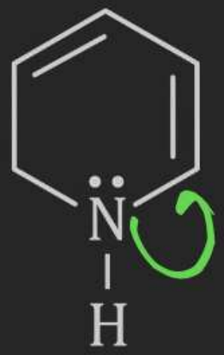
(B) 

(C) 

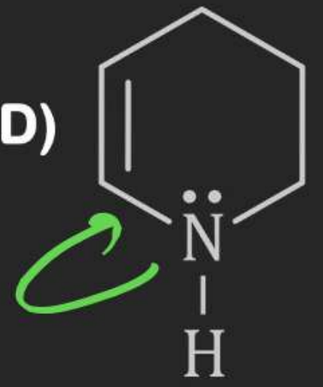
(D) 

Q.12 In which of the following, lone-pair indicated is involved in resonance:

(A) 

(B) 

(C) 

(D) 

(e) $CH_2 = CH - \ddot{C}H_2^{\ominus}$

(f) $CH_2 = CH - CH = \ddot{N}H$

Q.14 Which of the following groups cannot participate in resonance with other suitable group:

(a) $-COOH$ sp^2

(b) $-COOCH_3$ sp^2

(c) $-COCl$ sp^2

(d) $-\overset{\oplus}{N}H_3$ sp^3

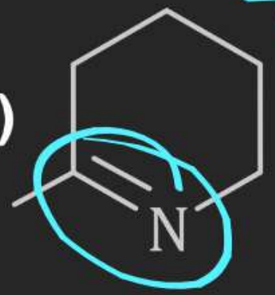
(e) $-\overset{\oplus}{C}H_2$ sp^2

—A=B / —A≡B

Q.16 Identify electron withdrawing groups in resonance among the following :

(a) $-COOH$ (b) $-CONHCH_3$ (c) $-COCl$ (d) $-CN$

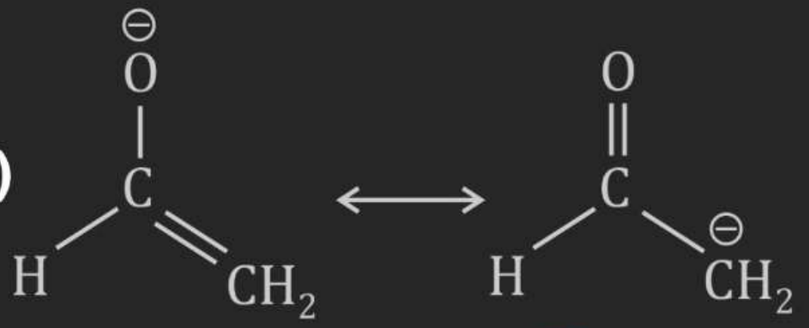
(e) $-\ddot{O}-CH=CH_2$ (f)

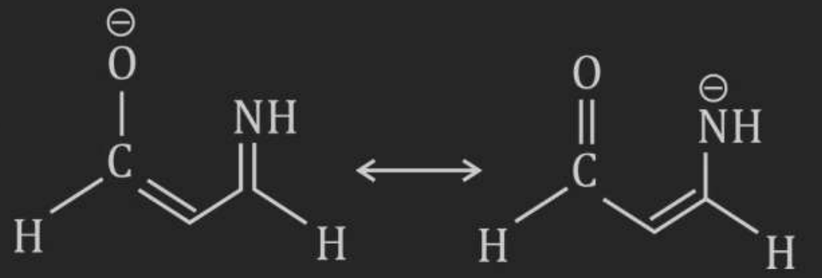


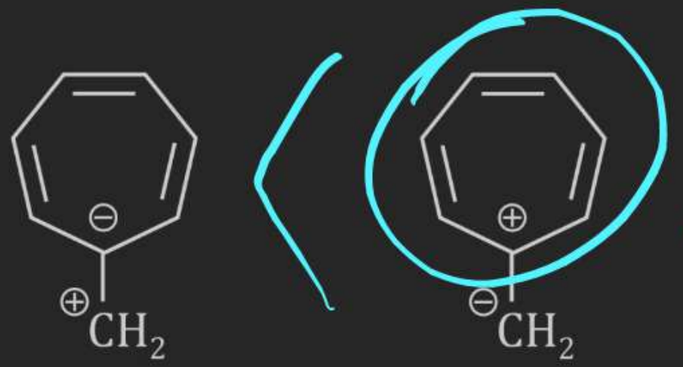
Q.19 Identify less stable canonical structure in each of the following pairs:

(a) $\overset{\oplus}{C}H_2 - O - CH_3 \leftrightarrow CH_2 = \overset{\oplus}{O} - CH_3$

(b) 

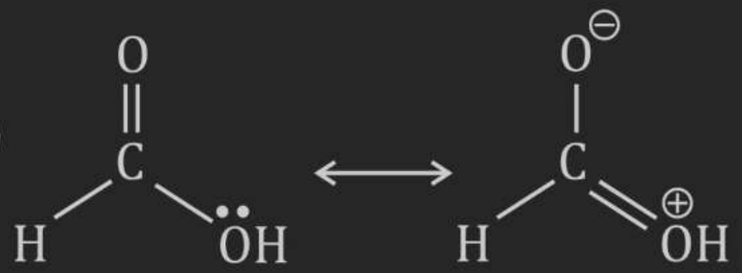
(c) 

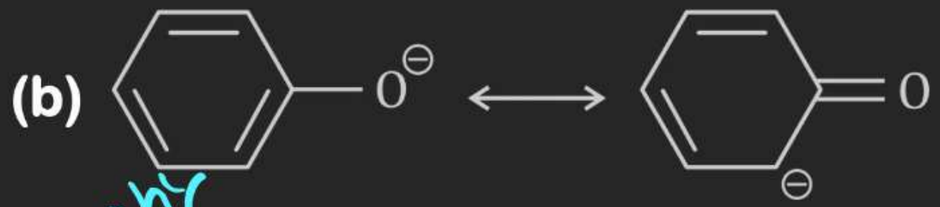
(d) 

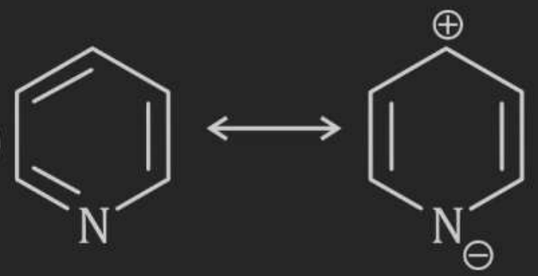
(e) 

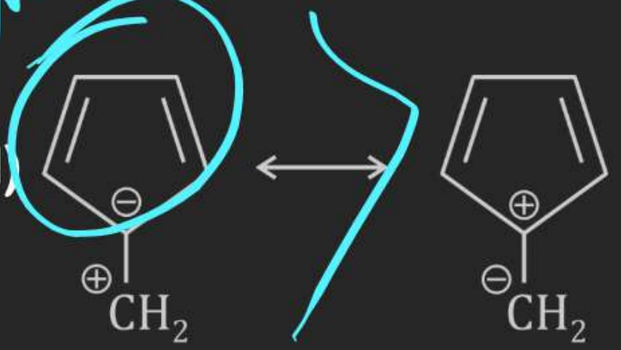
Aromatic

Q.20 Identify more stable canonical structure in each of the following pairs :

(a) 

(b) 

(c) 

(d) 

(e) $\overset{\oplus}{C}H_2 - CO = CH - \overset{\ominus}{O} \leftrightarrow CH_2 = CH - CH = O$

(f)