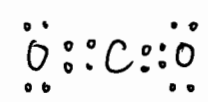
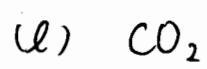
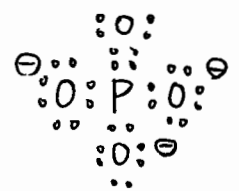
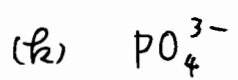
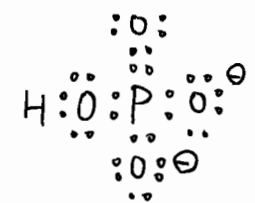
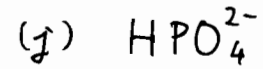
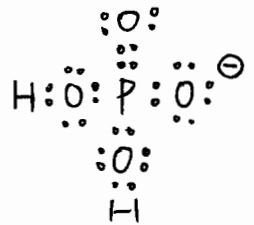
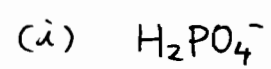
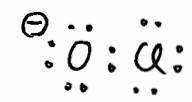
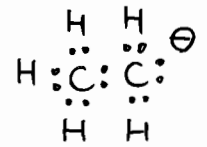
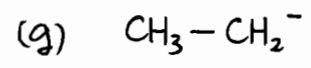
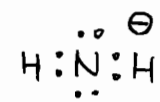
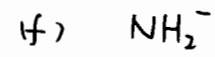
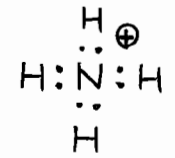
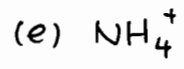
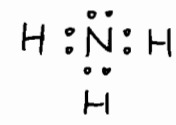
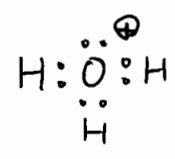
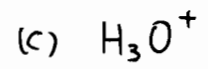
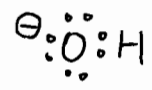
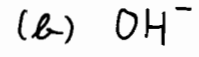
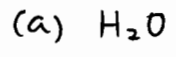
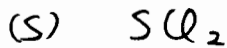
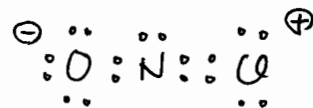
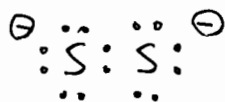
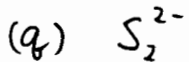
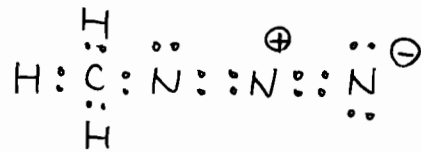
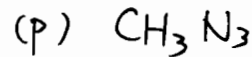
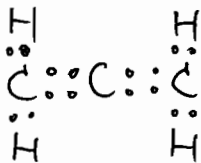
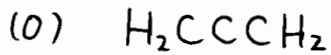
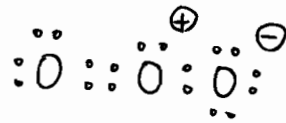
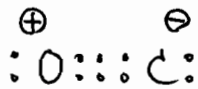


1. 12 価構造式 章末 問題解答例

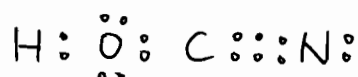
1.1 次の化学種の 12 価構造式を書きなさい。必要となる形式電荷や非共有電子対が書かれていない場合には誤りとする。



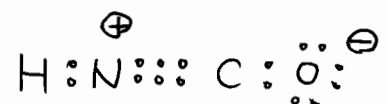


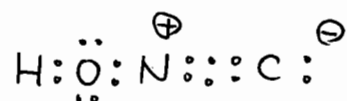
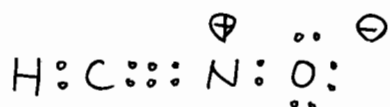
1.2 雷酸 HONC には次のように全部で 4 つの異性体が存在する
 HOCN (シアノ酸), HNCN (イソシアノ酸), HCNO (?),
 HONC (雷酸)。これら 4 つをそれぞれ構造式で書きなさい。ただし、形式
 電荷も明記すること。

シアノ酸 HOCN

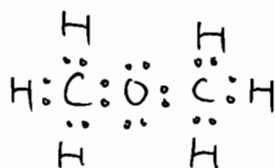
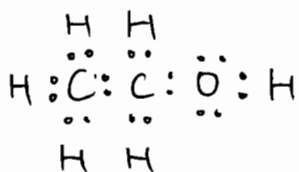


イソシアノ酸



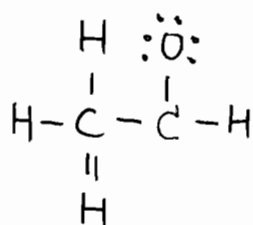
(?, 名前なし) HCNO 雷酸 HONC 

- 1.3 $\text{C}_2\text{H}_6\text{O}$ のすべての異性体を Lewis 構造式で書きなさい。ただし、この化合物の異性体数は 2 個である。

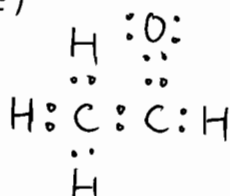


- 1.4 (a) アセトアルデヒド, (b) 酢酸 および (c) メタノールの誤った構造式を示した。電子配置を訂正し、正しい Lewis 構造式を書きなさい。

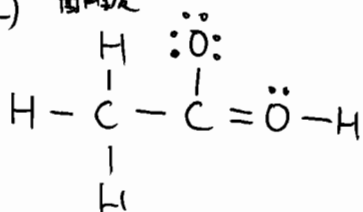
(a) アセトアルデヒド

 \Rightarrow

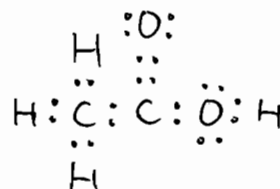
(正)



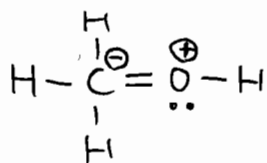
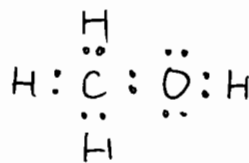
(b) 酢酸

 \Rightarrow

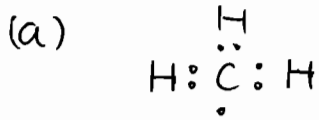
(正)



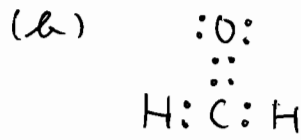
(c) メタノール

 \Rightarrow 

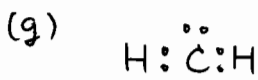
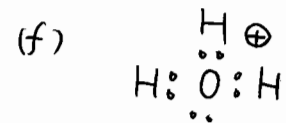
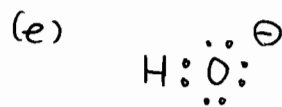
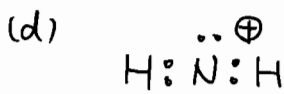
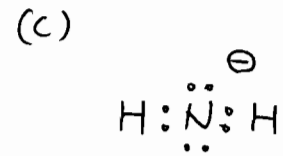
1.5 次の化学種に必要な形式電荷を書き加えて、Lewis構造式を完成させて下さい。電荷が不要な場合には、「電荷なし」と書くこと。



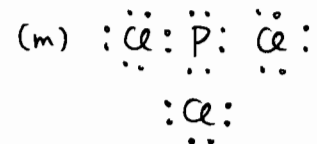
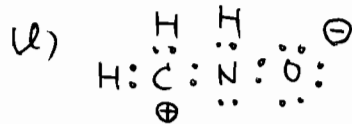
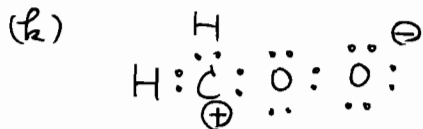
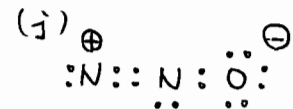
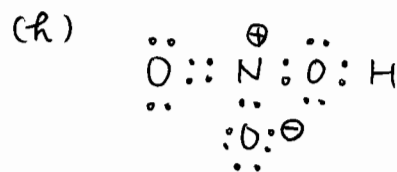
電荷なし



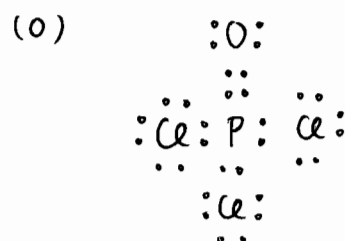
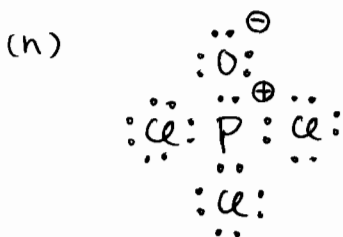
電荷なし



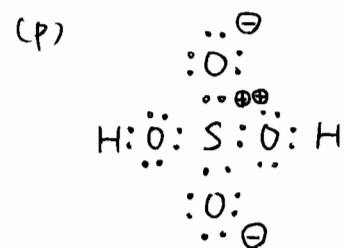
電荷なし



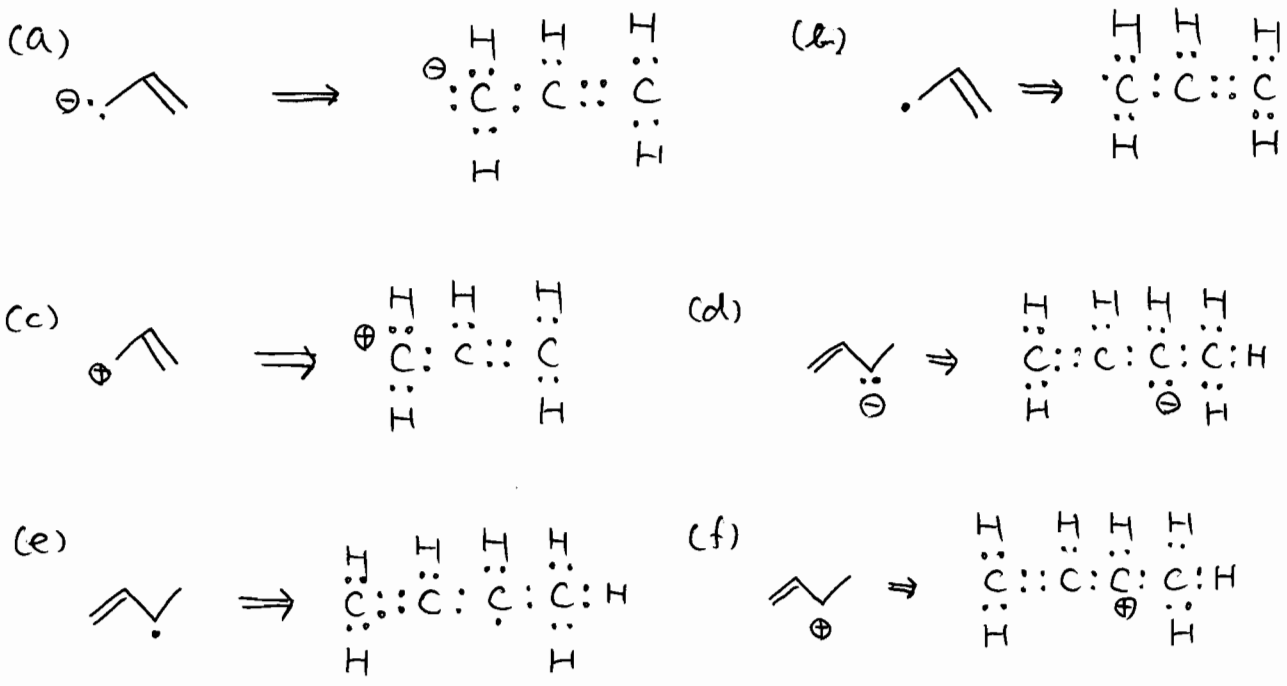
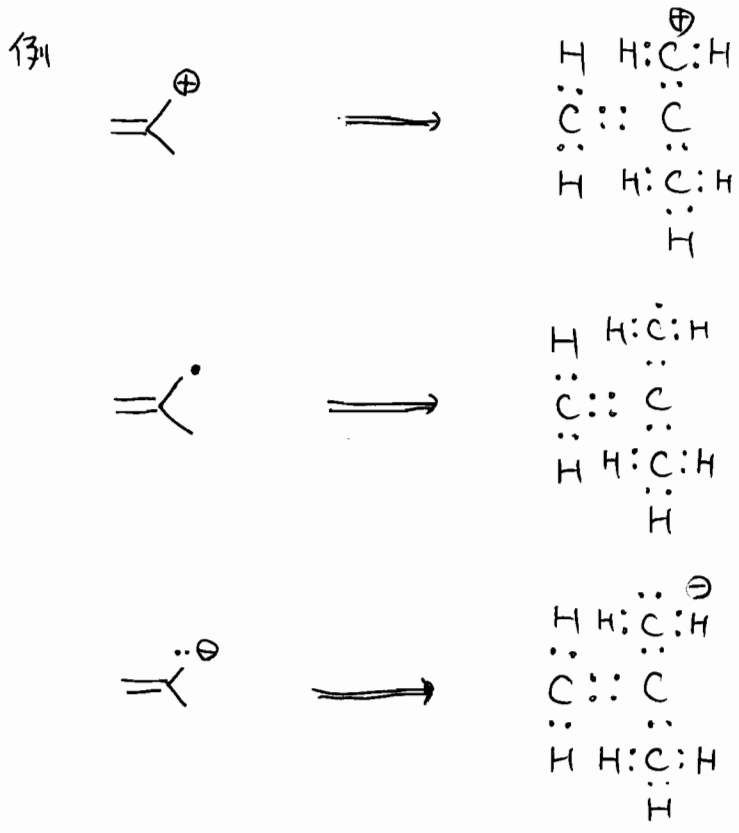
電荷なし

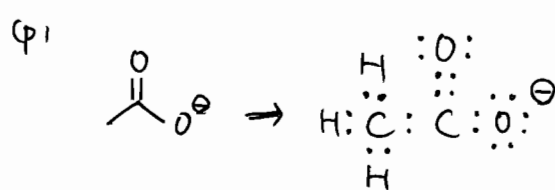
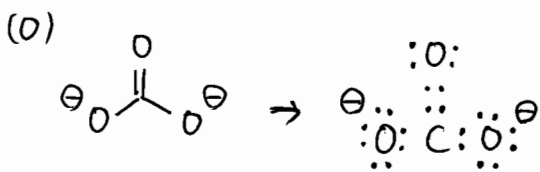
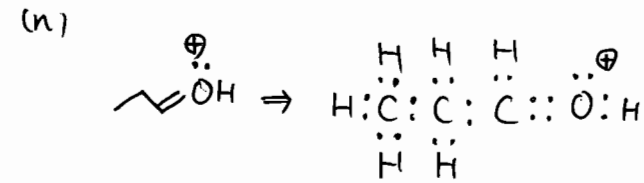
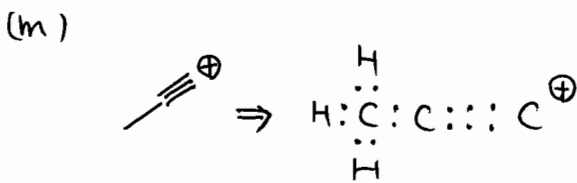
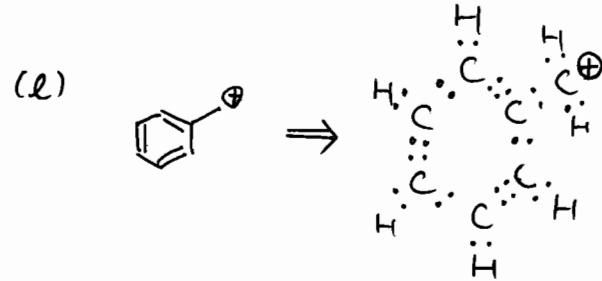
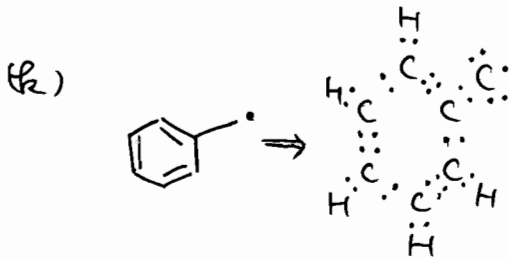
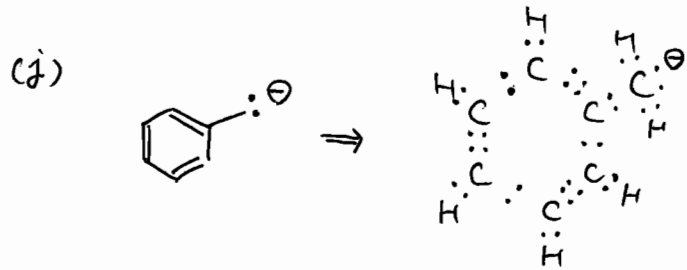
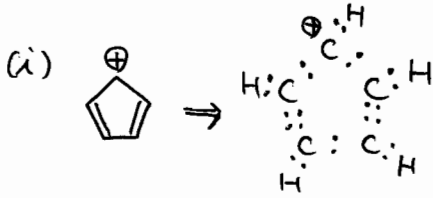
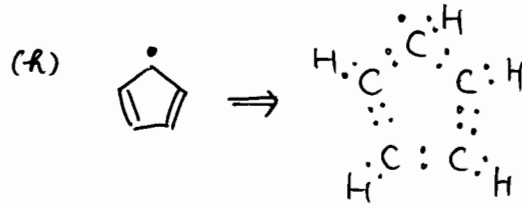
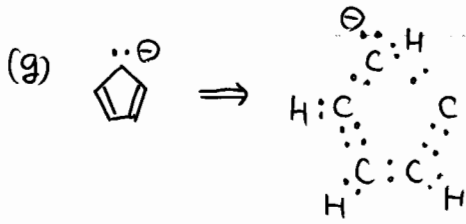


電荷なし

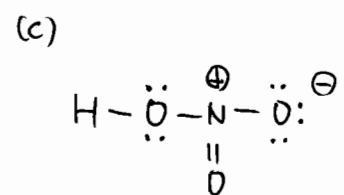
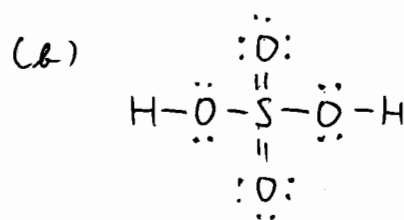
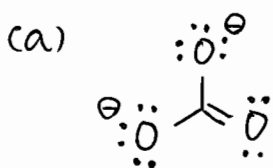


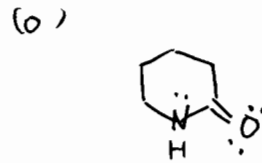
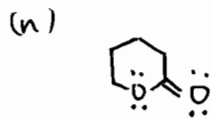
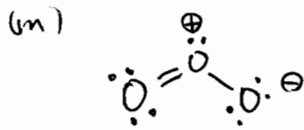
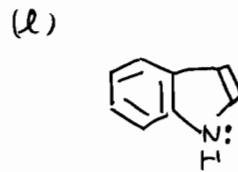
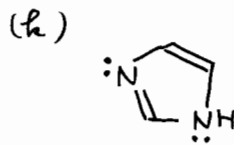
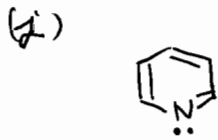
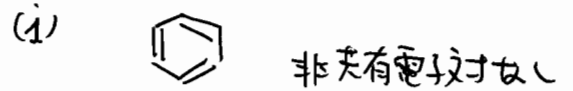
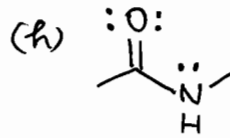
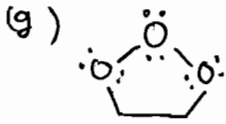
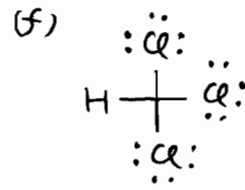
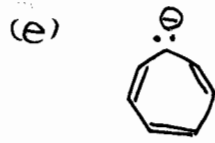
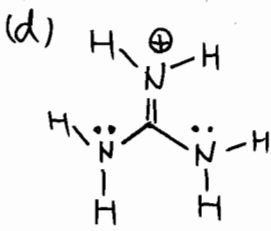
1.6 例にならて省略した構造式からLewis構造式に変換せよ。





1.7 非共有電子対を書き加えなさい。不要な場合には、「非共有電子対なし」と書きなさい。

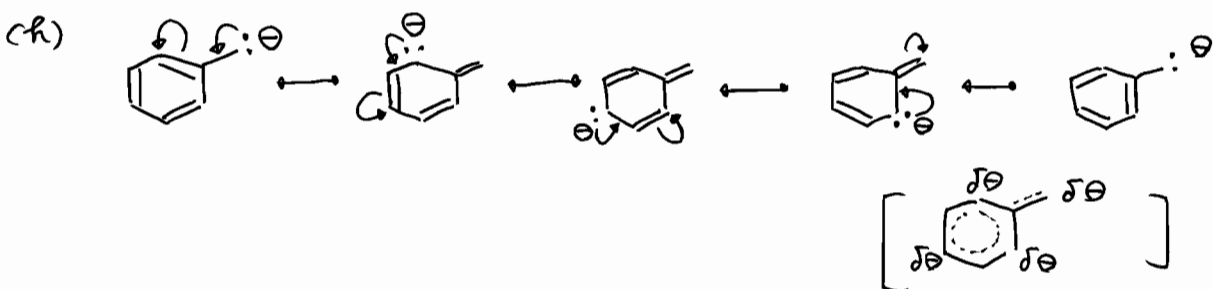
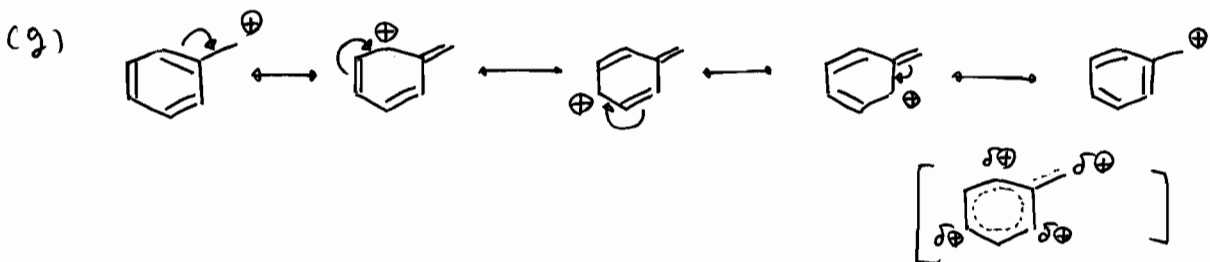
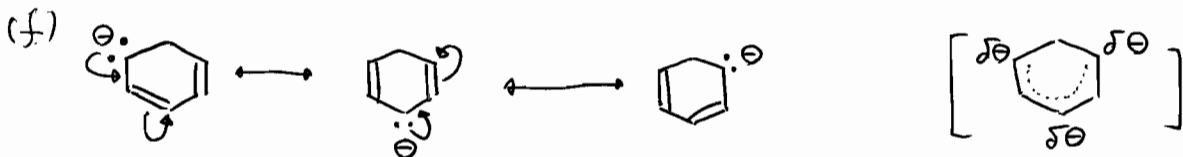
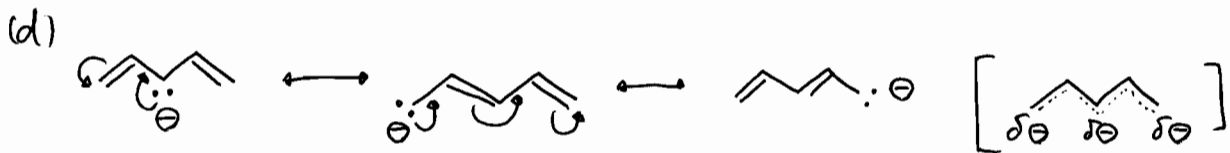
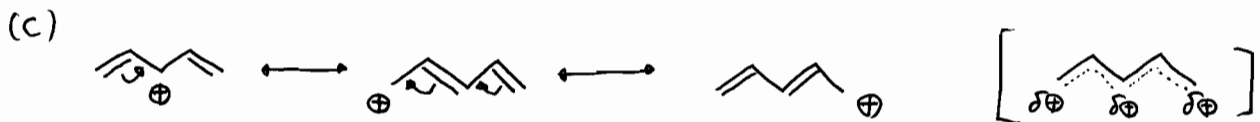
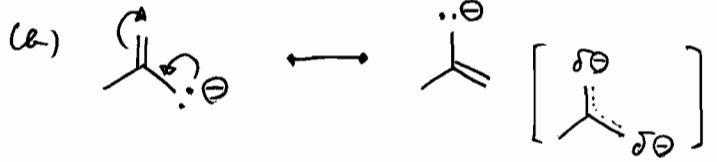
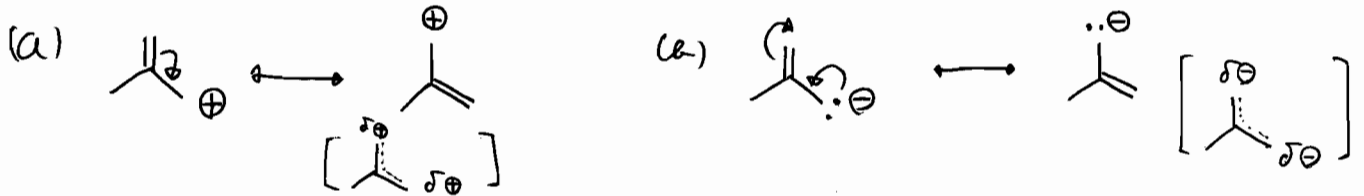


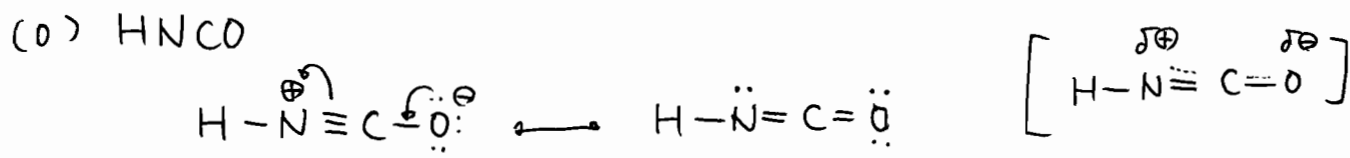
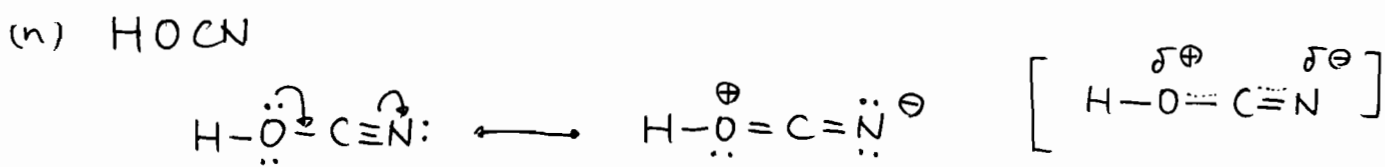
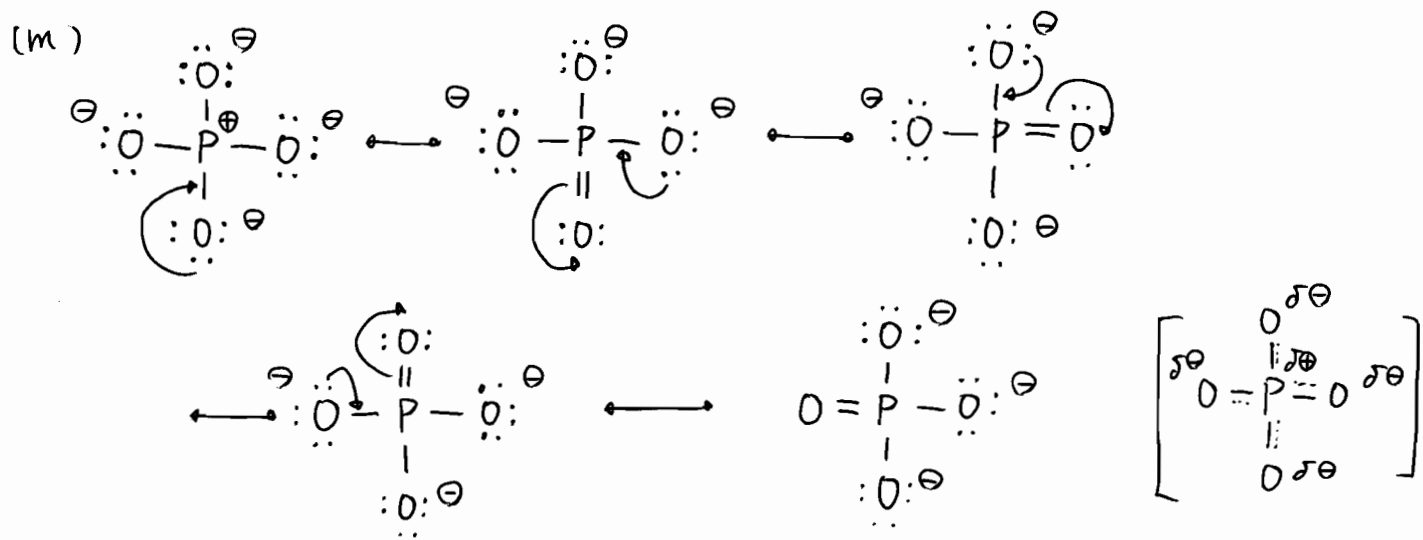
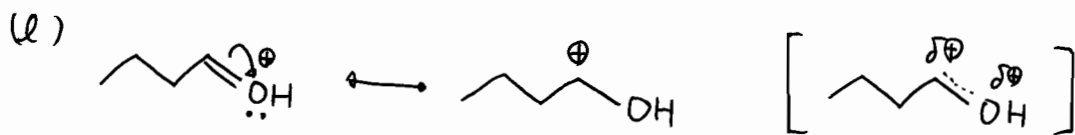
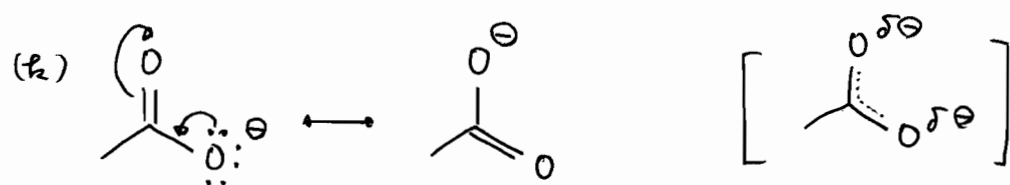
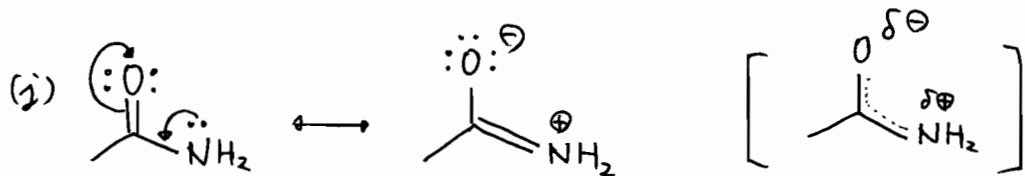
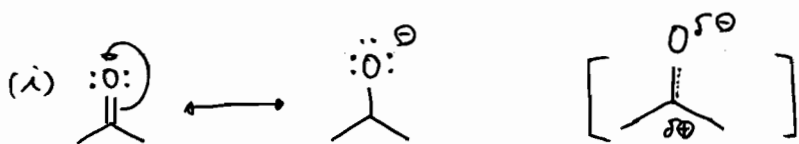


2. 共鳴構造 章末問題 解答例

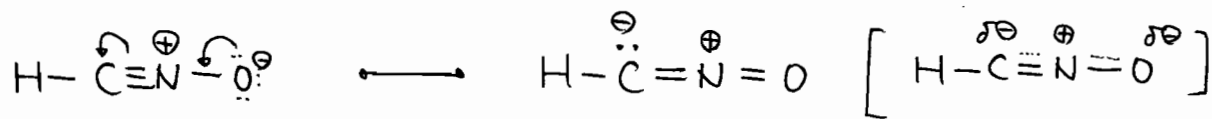
8

1.1 次の共鳴構造を書きなさい。ただし、電子対の移動を表す曲った矢印、形式電荷も明記すること。

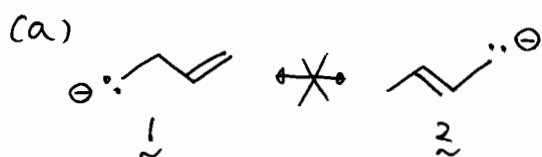




(P) HCNO



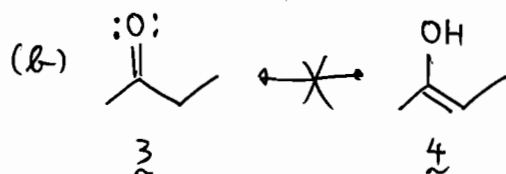
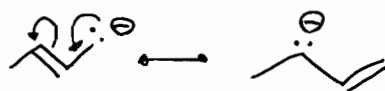
1.2 次の組み合わせのうち、共鳴構造の関係にないものは何か。理由も説明すること



共鳴構造の関係にはない。

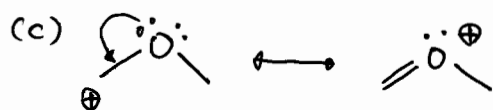
1は共鳴構造が書けない

2の共鳴構造は次のとおり

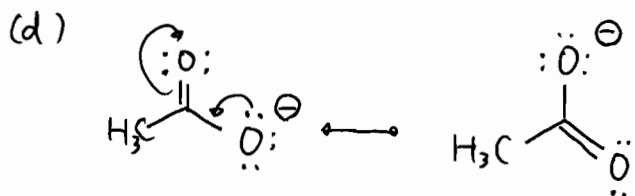


共鳴構造の関係にはない

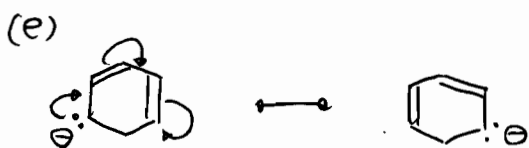
3から4への変化には H^+ の移動が起るから。(共鳴構造で議論する場合には結合は切断してはならない)



共鳴構造

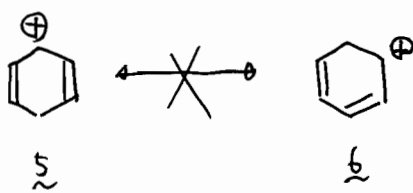


共鳴構造



共鳴構造

(f)

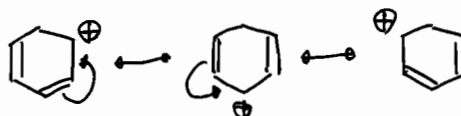


共鳴構造の関係にない

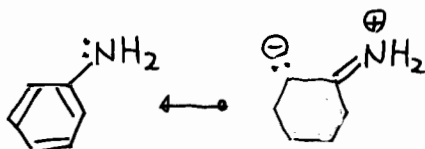
5の共鳴構造



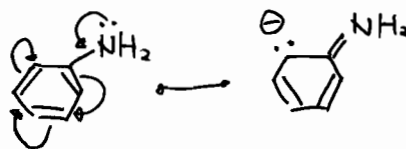
6の共鳴構造



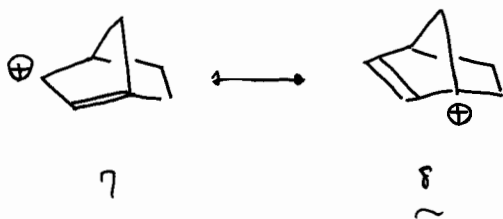
(g)



共鳴構造である

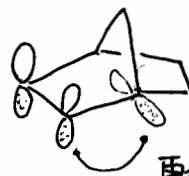


(h)



共鳴構造の関係にない

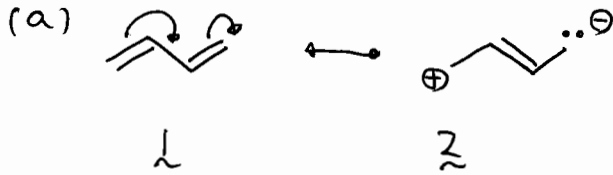
p軌道の重なりが異なるため(8)



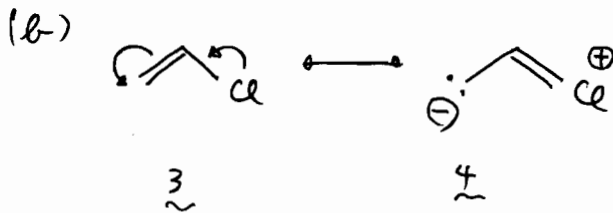
軌道の向きが約90°おじれて
いるためにp軌道の重なりが異なる

よけかたのひずみのたが構造

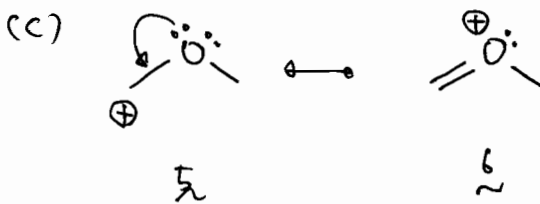
2.3 次の組み合わせのうち、寄与の大きい共鳴構造はどちらか。理由も説明すること。等価な場合は、「等価な場合である」と答えなさい。



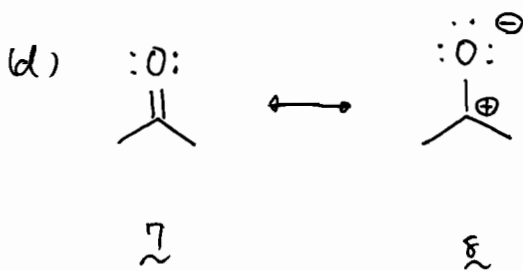
1の方が寄与が大きい
2は電荷が分離しているため
1に比べ寄与が小さい
⊕電荷のある炭素はオクテットを満たしていない



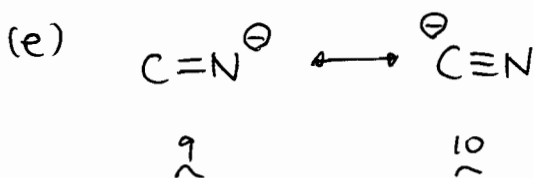
3の方が寄与が大きい
4は電荷が分離しているから



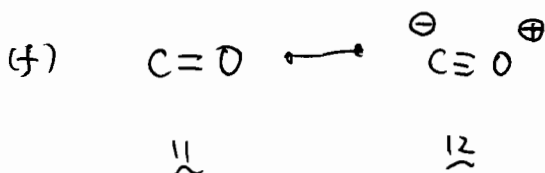
6の方が寄与が大きい
5の⊕電荷を持つ炭素原子はオクテットを満たしていないため



7の方が寄与が大きい
8の⊕電荷を持つ炭素原子はオクテットを満たしていないため

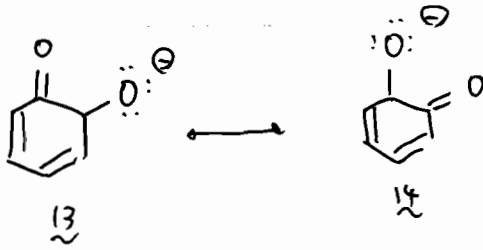


10の方が寄与が大きい
9の炭素原子は6電子状態のため



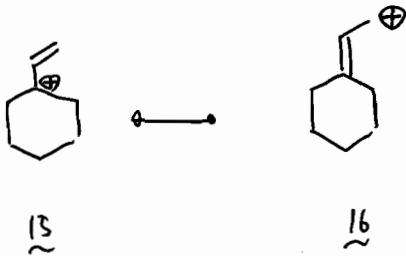
12の方が寄与が大きい
11の炭素原子は6電子状態のため

(g)



等価である

(h)



15, 16とも存在すると仮定すると

15は3級のカルボカチオン

16は1級のカルボカチオン

一般に、カルボカチオンの安定性は

3級 > 2級 > 1級 であり

3級の方が安定である

15の方が寄与が大きい。

