

Organic Chemistry (chapter 1)

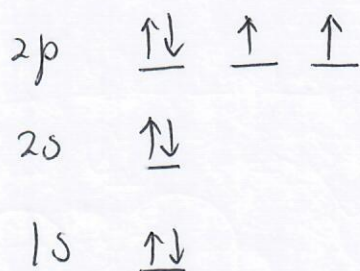
problem 1.1-1

Q = Electron configuration?

(a) Oxygen

The atomic # is 8

Oxygen has 8 protons and 8 electrons.

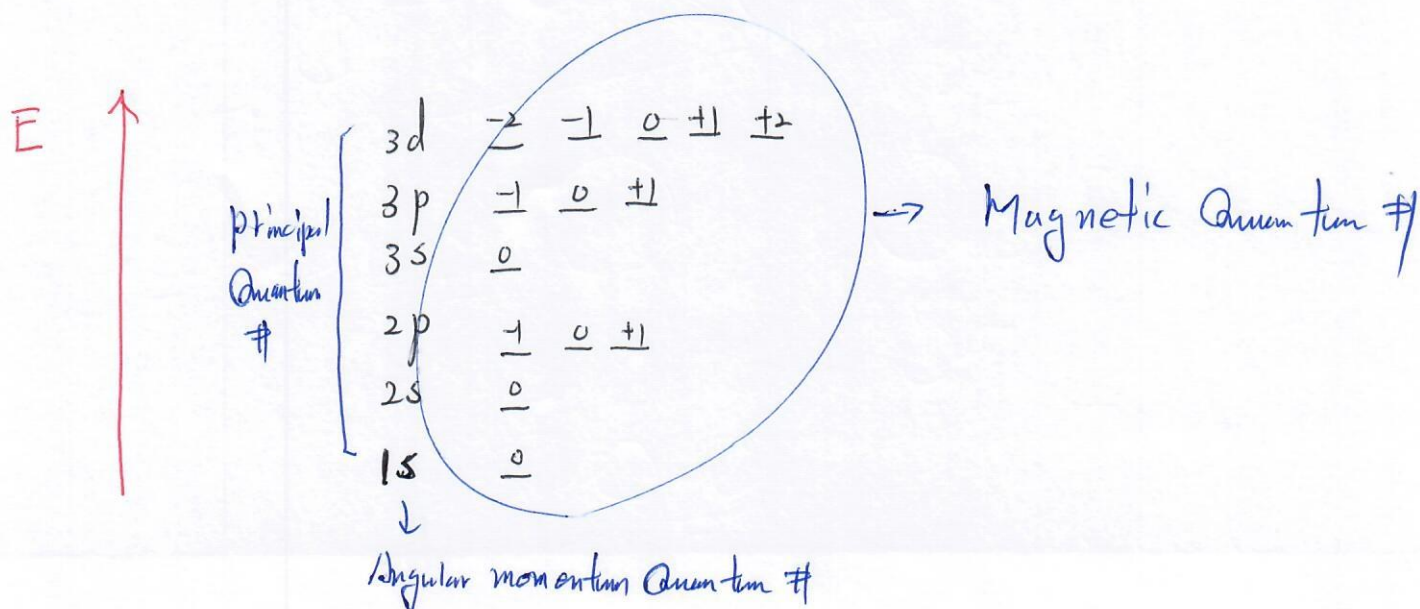


$n = 1, 2, \dots$ (Principal Quantum #)

$l = 0, 1, 2, \dots$

s, p, d, f, g, ... (Angular momentum Quantum #)

0, -1, 0, +1, -2, -1, 0, +1, +2, ... (Magnetic Quantum #)



problem 1.1-2

(b) Nitrogen. \rightarrow Atomic # is 7.

2p \uparrow \uparrow \uparrow

2s $\uparrow\downarrow$

1s $\uparrow\downarrow$

(c) Sulfur \rightarrow Atomic # is 16

3p $\uparrow\downarrow$ \uparrow \uparrow

3s $\uparrow\downarrow$

2p $\uparrow\downarrow$ $\uparrow\downarrow$ $\uparrow\downarrow$

2s $\uparrow\downarrow$

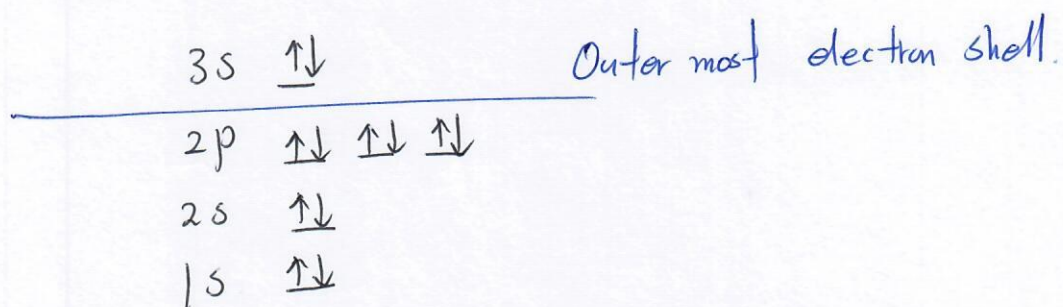
1s $\uparrow\downarrow$

problem 1-2-1

Q: outermost electron shell

(a) Magnesium.

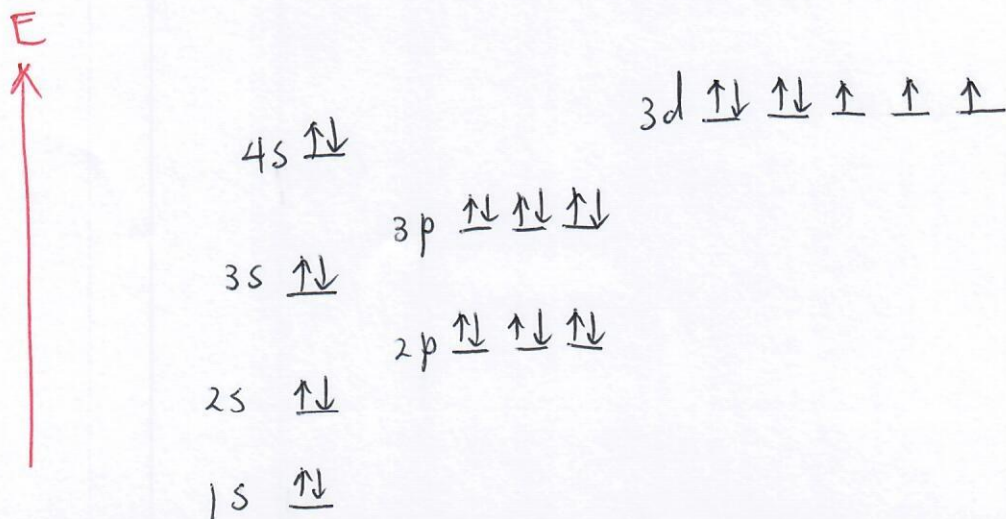
Mg atomic # : 12.



The outermost electron shell is 3s
and this shell has 2 electrons.

(b) Cobalt

Co atomic # : 27.



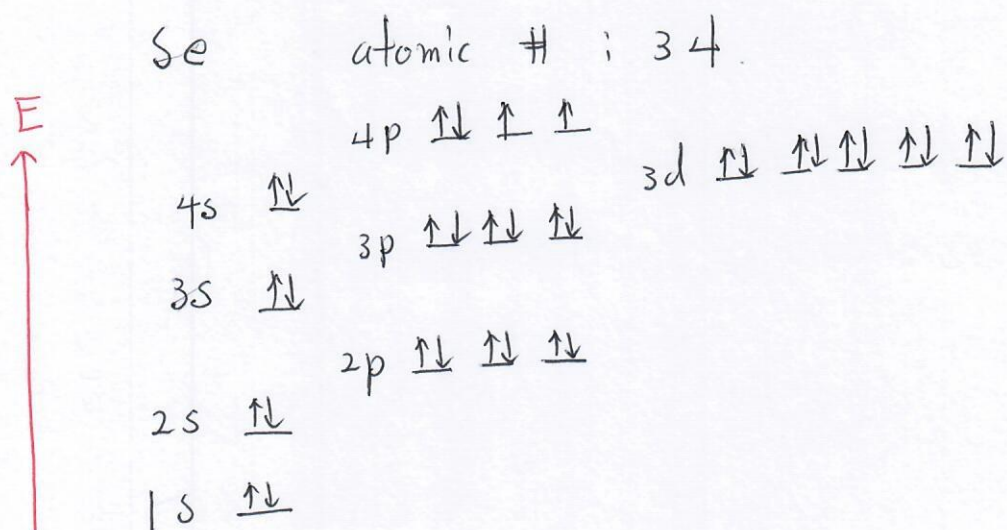
problem 1-2-2

(b) The energy level of 3d is higher than 4s.

So 4s and 3d make the hybrid orbital.
because of transition metal.

The outmost electron shell is 4s and 3d
and these shells have 9 electrons.

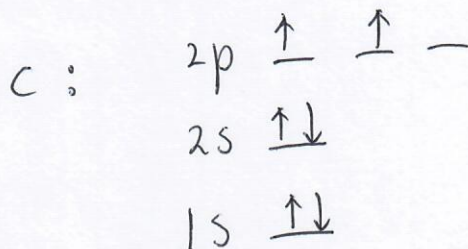
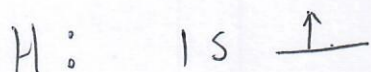
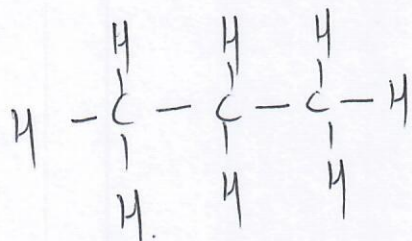
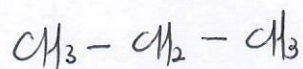
(c) Selenium.



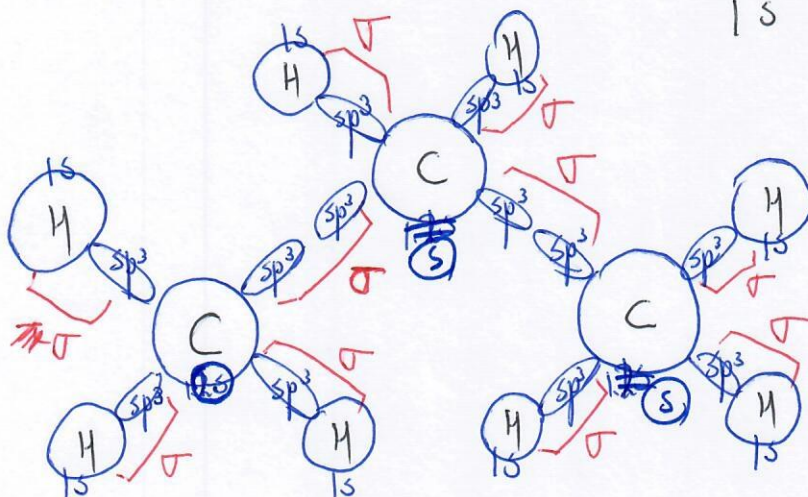
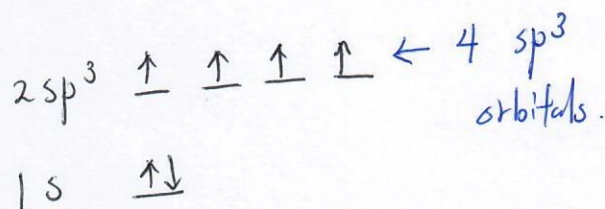
The outmost electron shell is 4s and 4p

These shells have 6 electrons.

Problem 1-8.



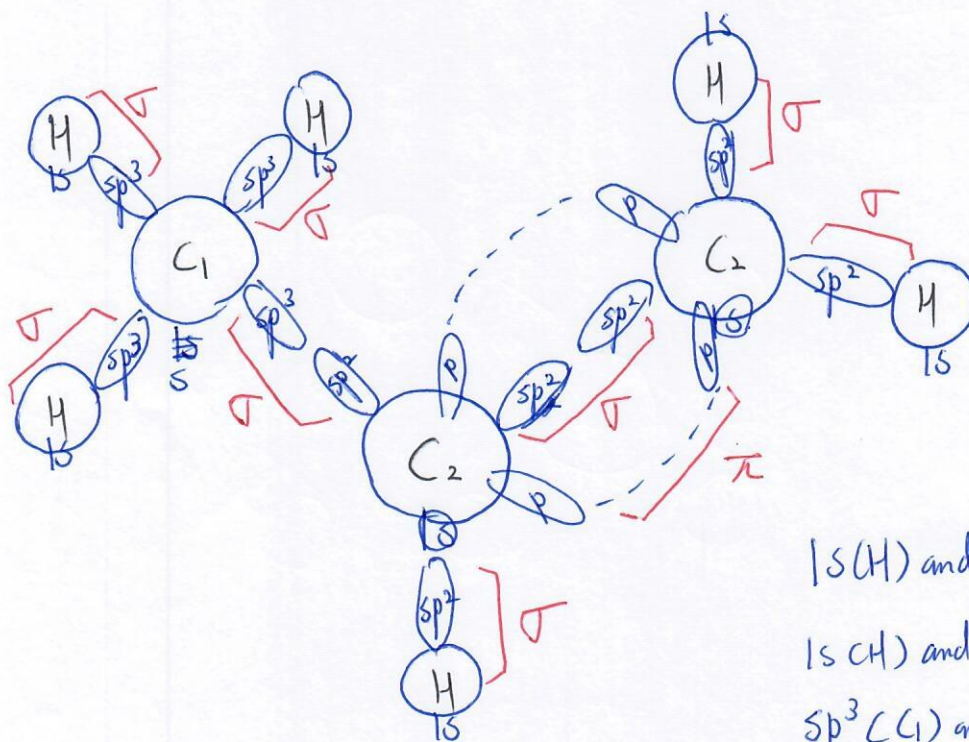
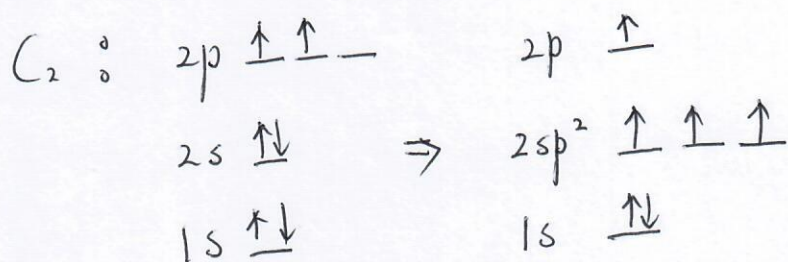
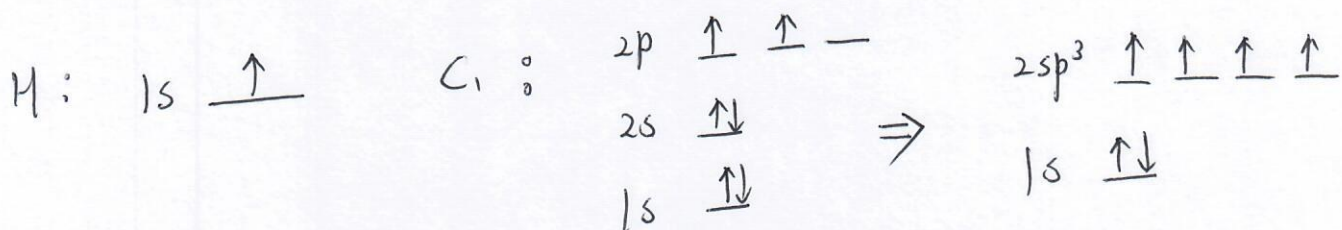
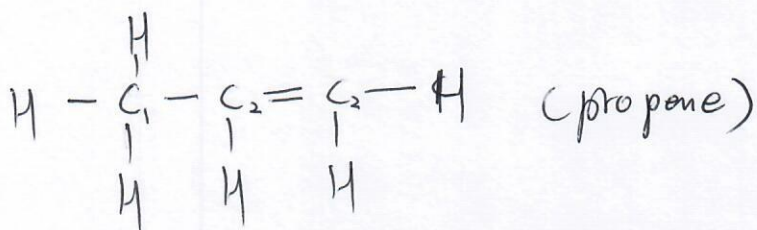
↓ hybrid orbital



$1s$ of H and sp^3 of C make σ bond.

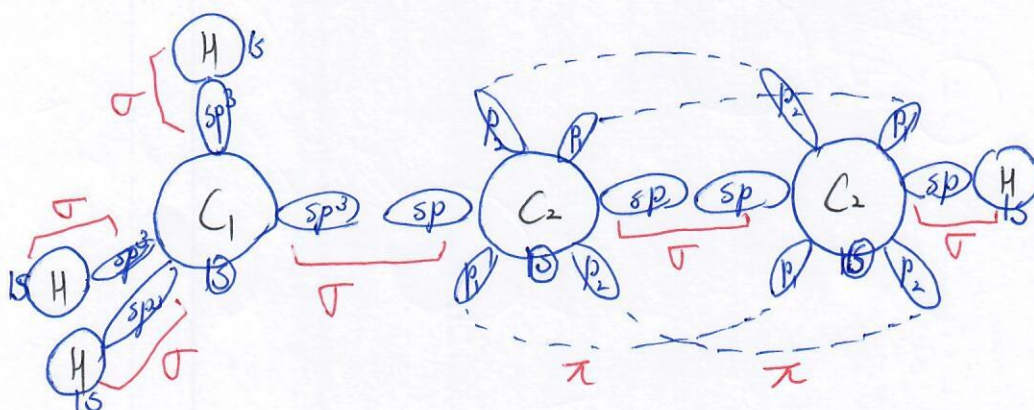
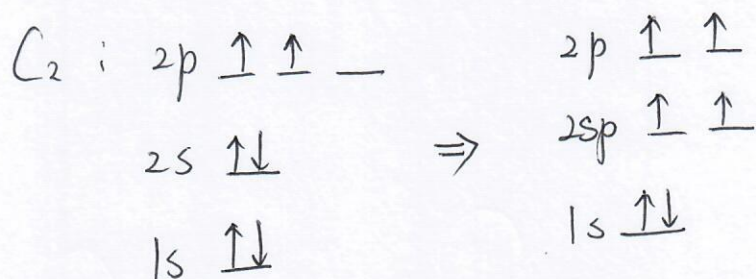
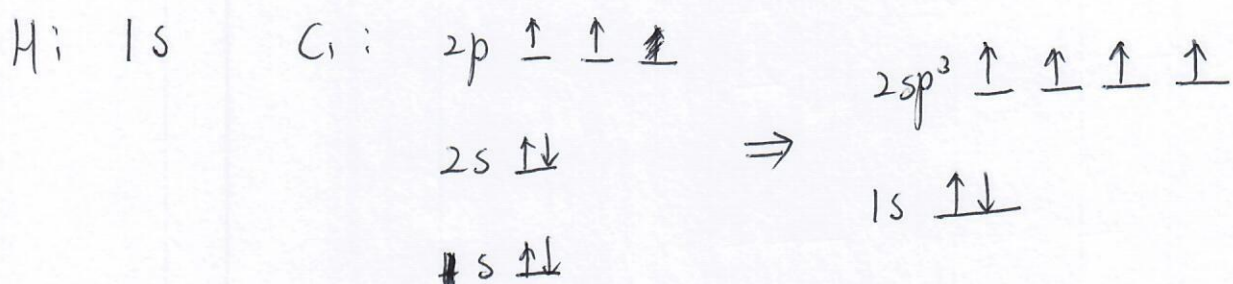
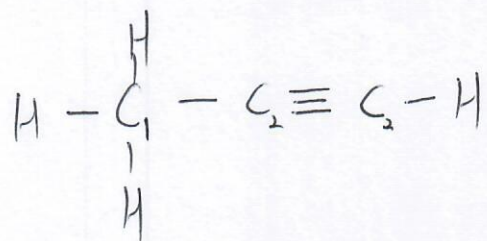
sp^3 of C and sp^3 of C make σ bond.

problem 1-10



$1s(\text{H})$ and $sp^3(\text{C}_1)$: σ bond
 $1s(\text{H})$ and $sp^2(\text{C}_2)$: σ bond
 $sp^3(\text{C}_1)$ and $sp^2(\text{C}_2)$: σ bond
 $sp^2(\text{C}_2)$ and $sp^2(\text{C}_1)$: σ bond
 $p(\text{C}_2)$ and $p(\text{C}_1)$: π bond.

Problem 1-13

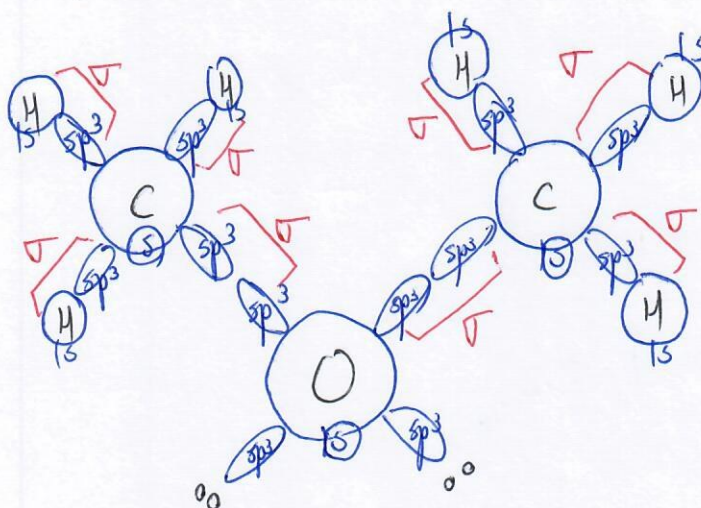
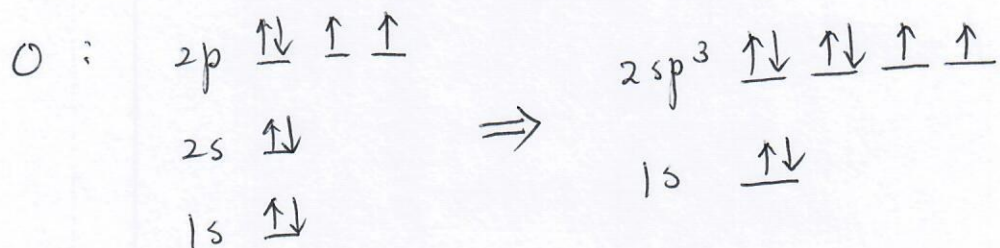
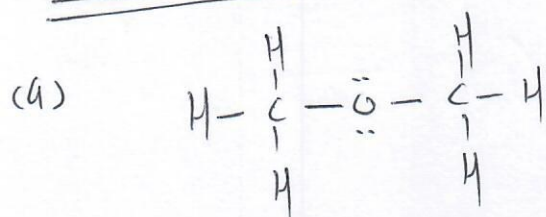


1s (H) and $sp^3(C_1)$: σ bond
 $sp^3(C_1)$ and $sp(C_2)$: σ bond
 $sp(C_2)$ and 1s (H) : σ bond.

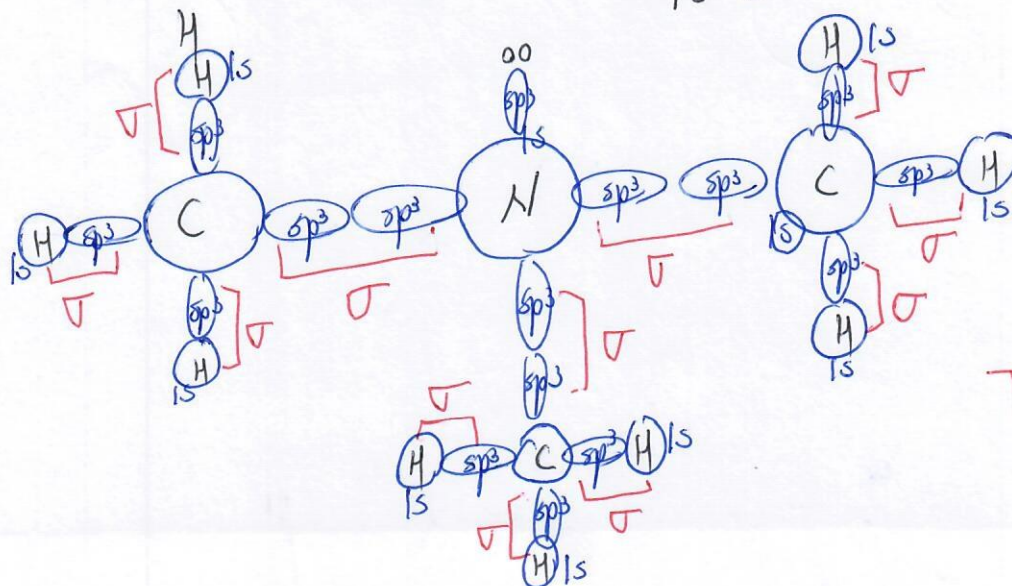
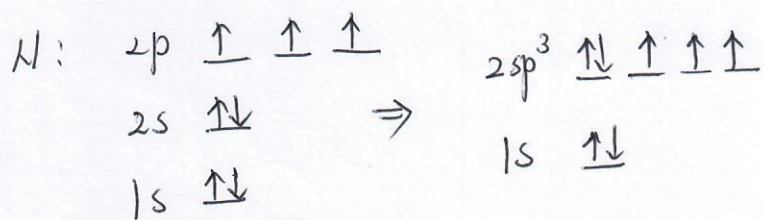
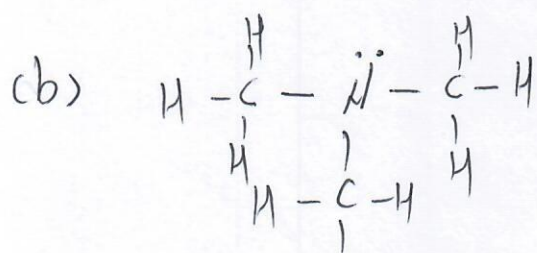
$p_1(C_2)$ and $p_1(C_3)$: π bond
 $p_2(C_2)$ and $p_2(C_3)$: π bond.

~~$p_1(C_2)$ and $p_1(C_3)$~~ $sp(C_2)$ and $sp(C_3)$: σ bond.

problem 1.14-1



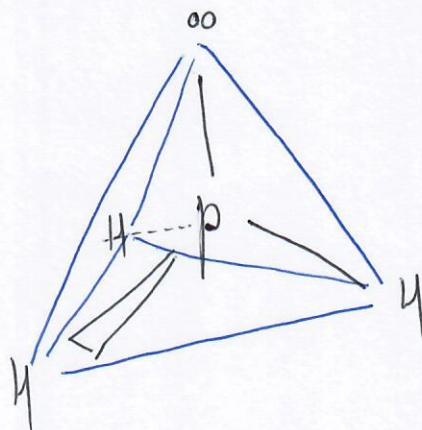
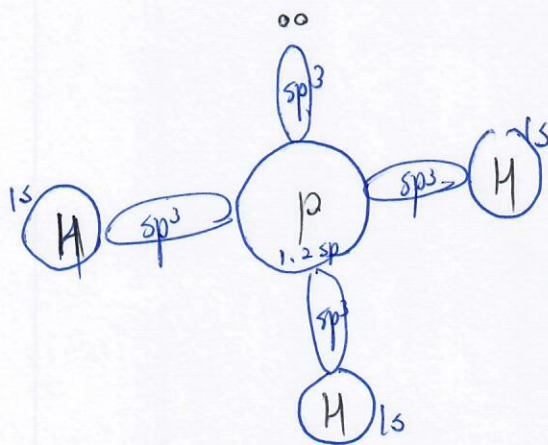
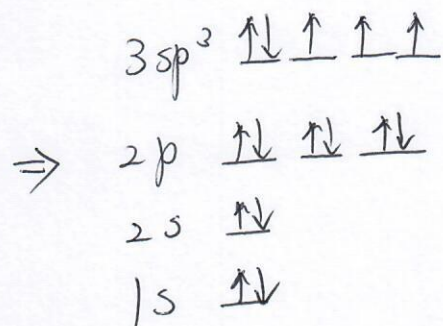
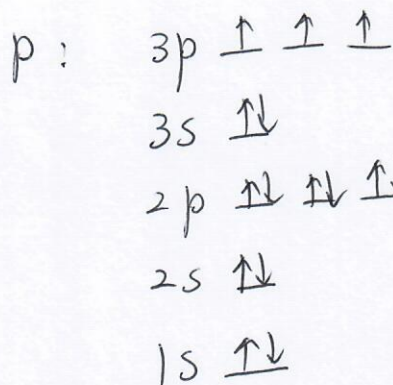
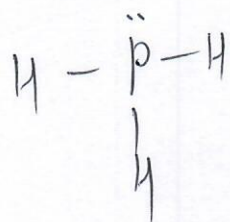
Tetrahedral



Tetrahedral

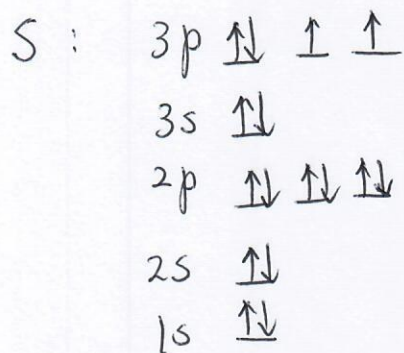
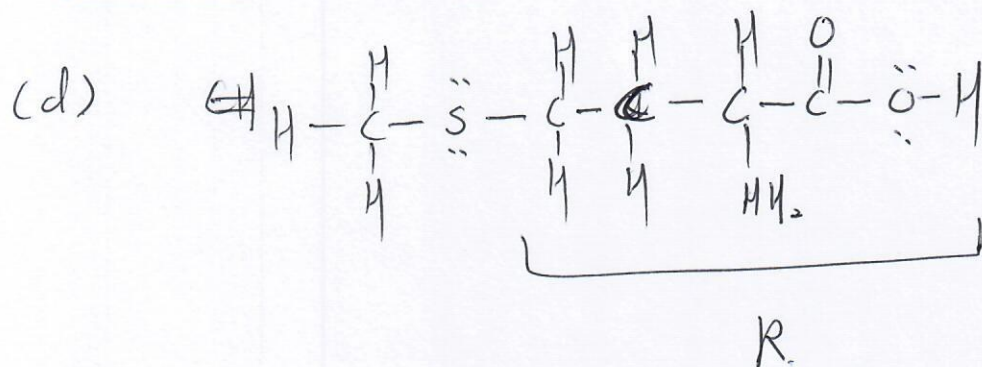
problem 1.14-2

(C)

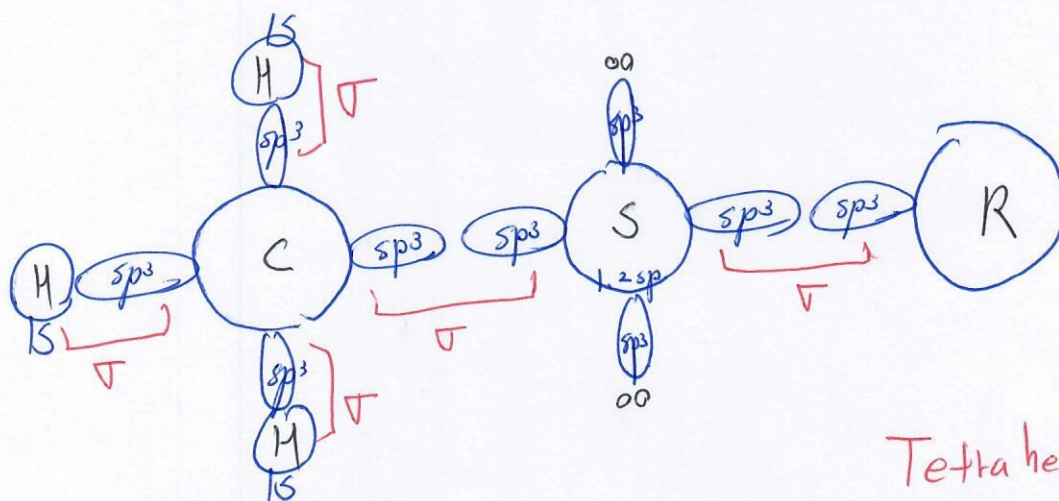
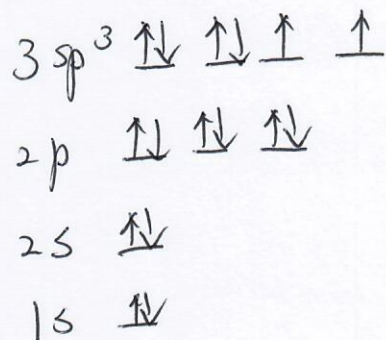


Tetrahedral

problem 1.14-3



\Rightarrow



Tetrahedral