2

a. Ay and Bx

b. Ay has larger lattice energy

c. Bx has the smaller lattice energy

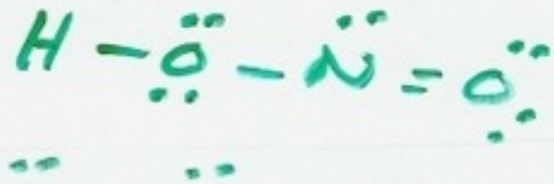
4

a. Ru

b. $[Kr]\ 5s^2\ 4d^6$

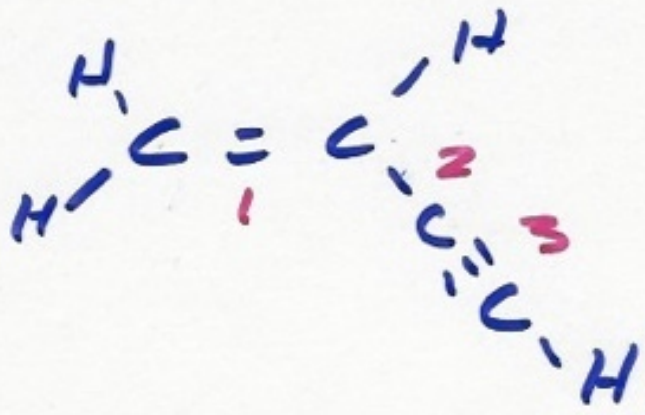
6

a. HNO_2

b. 

c. NO_2^-

d. I would expect the NO_2^- double bond to be longer.

7] 

a. Bond length

b. 3 < 1 < 2

c. 3 > 1 > 2

Bond strength

9] a. Valence electrons are outer electrons

b. Nitrogen has 5 valence electrons

c. $[1s^2 2s^2 2p^6]$ $3s^2 3p^2$

core Valence

Si has 4 valence electrons

13] a) $\dot{\underset{\cdot}{Al}}\cdot$ b) $:\ddot{\underset{\cdot\cdot}{Br}}\cdot$ c) $:\ddot{\underset{\cdot\cdot}{\dot{A}r}}:$

d) $\cdot Sr\cdot$

15] $\cdot Mg\cdot + :\ddot{O}\cdot \longrightarrow Mg^{2+}\left[:\ddot{O}:\right]^{2-}$

18] a. BaF_2 c. Li_3N

b. $CsCl$ d. Al_2O_3

21] a. Lattice energy is the energy required to expand 1 mole of ionic solid into the gas phase.

b. $F = k\dfrac{QQ}{r^2}$ — charge

— size

26

a. $NaCl > RbBr > CsBr$

smaller ions

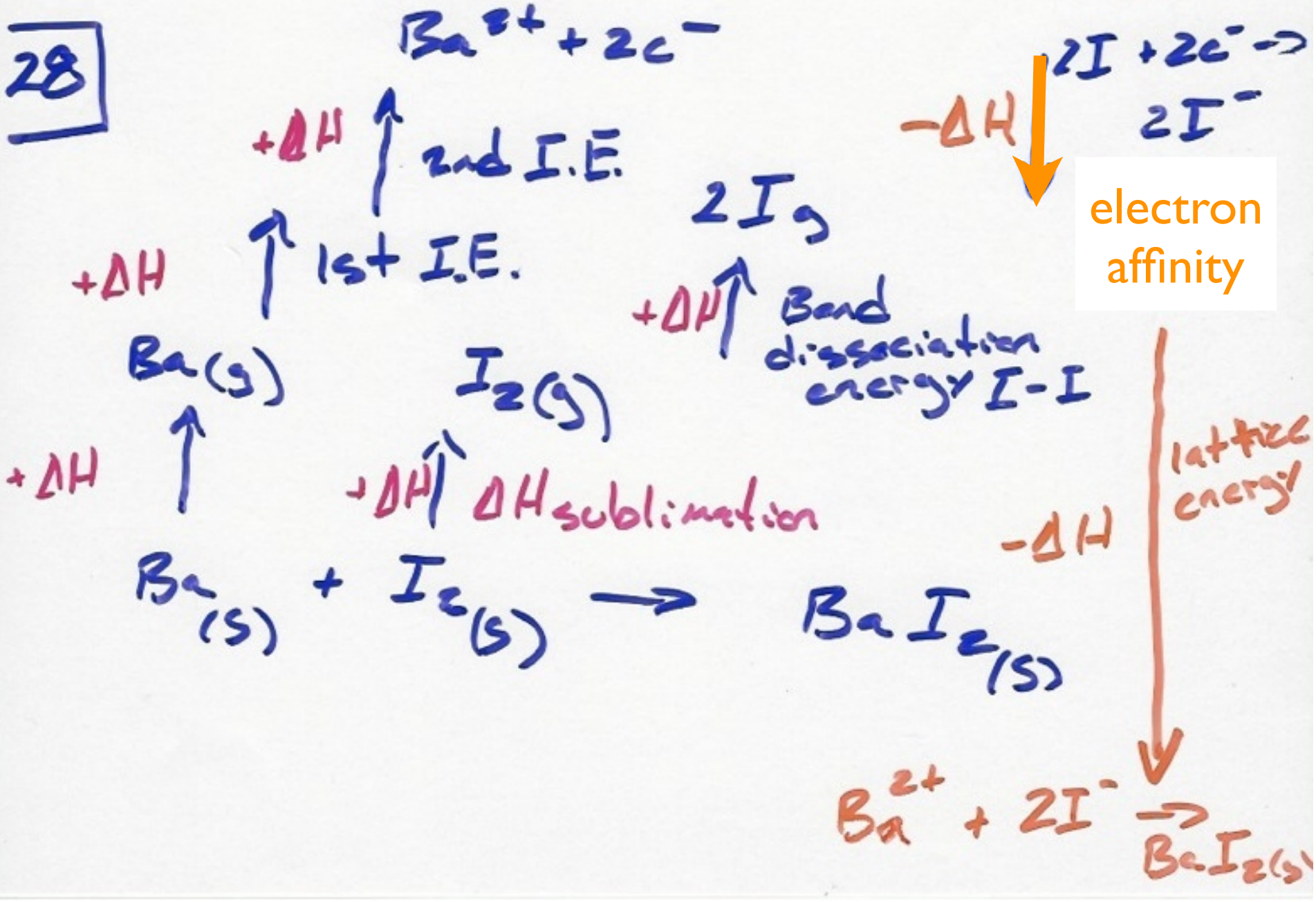
b. $BaO > KF$

greater charge on cation and anion

c. $SrO > SrCl_2$

greater charge and smaller size of the anion.

28



31 a. A covalent bond is formed when 2 or more pairs of electrons are shared.

b. $2H_2 + C \rightarrow CH_4$

$O_2 + Si \rightarrow Si:O_2$

$\frac{3}{2} Cl_2 + P \rightarrow PCl_3$

c. A low boiling point is a clue that xy is a molecule.

40 a. O c. C

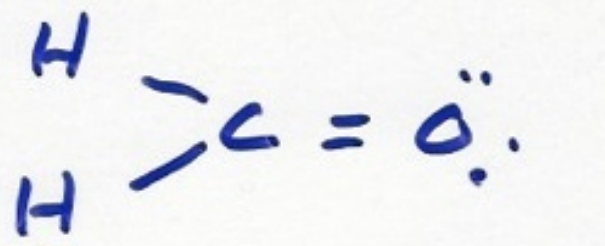
b. Al d. F

41 a. $B \xrightarrow{} F$ c. $Se \xrightarrow{} O$

b. $Cl - Cl$ non d. $H \xrightarrow{} Cl$

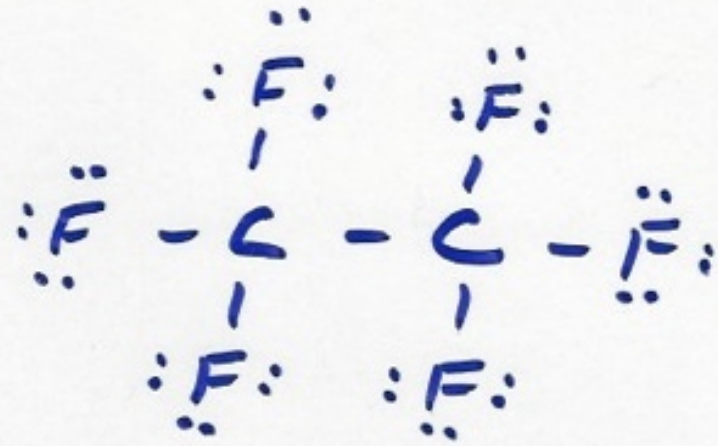
48

a.
2 H
6 O
4 C
12e
-6

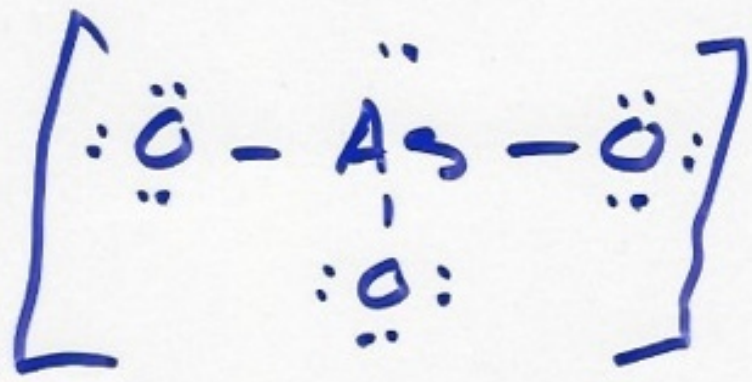


b.
12 O
2 H
14e
-6

c.
42 F
8 C
50
-14



d.
18 O
5 As
3 (3-)
26
-6

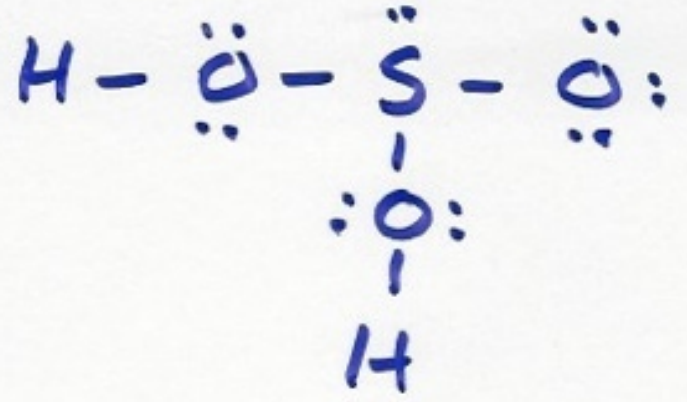


48

e.

18 O
6 S
2 H

26
-10



f.

8 C
2 H

10
-6

H - C ≡ C - H

50

a.

21 F
5 P

26
-6

b. oxidation state of P is 3+

c. Formal charge is 0

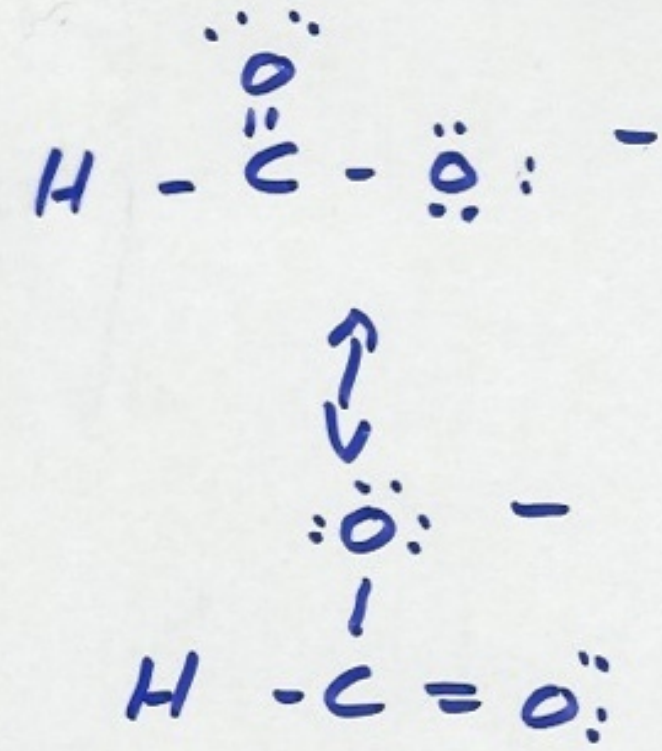
d. Both oxidation state and formal charge are only estimations of molecular atomic charge.

54

a.

4 C
12 O
1 H
1 (1-)

18e-
-6

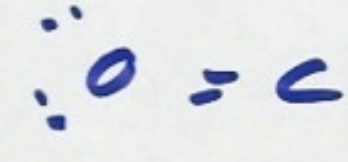


b. resonance

c.

12 O
4 C

16e
-4



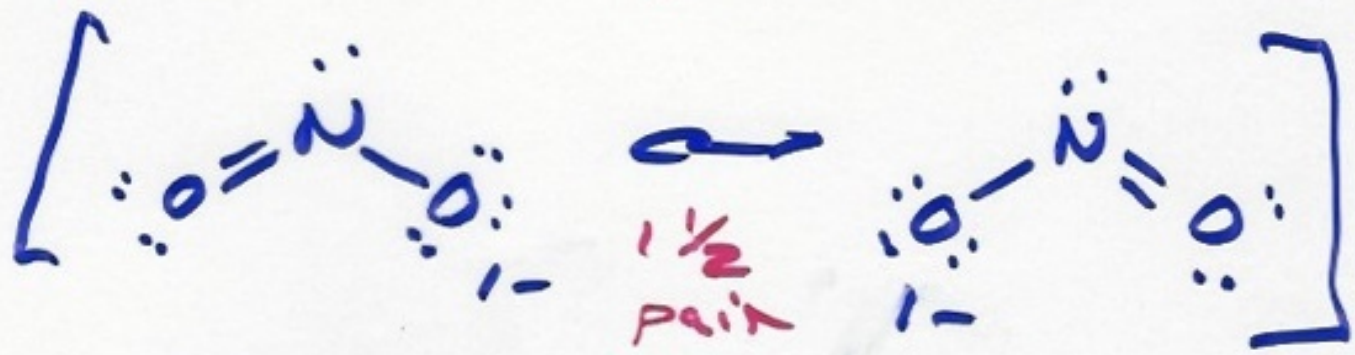
d. Formate would have longer C-O Bonds.
(part double bond part single bond due to resonance)

56

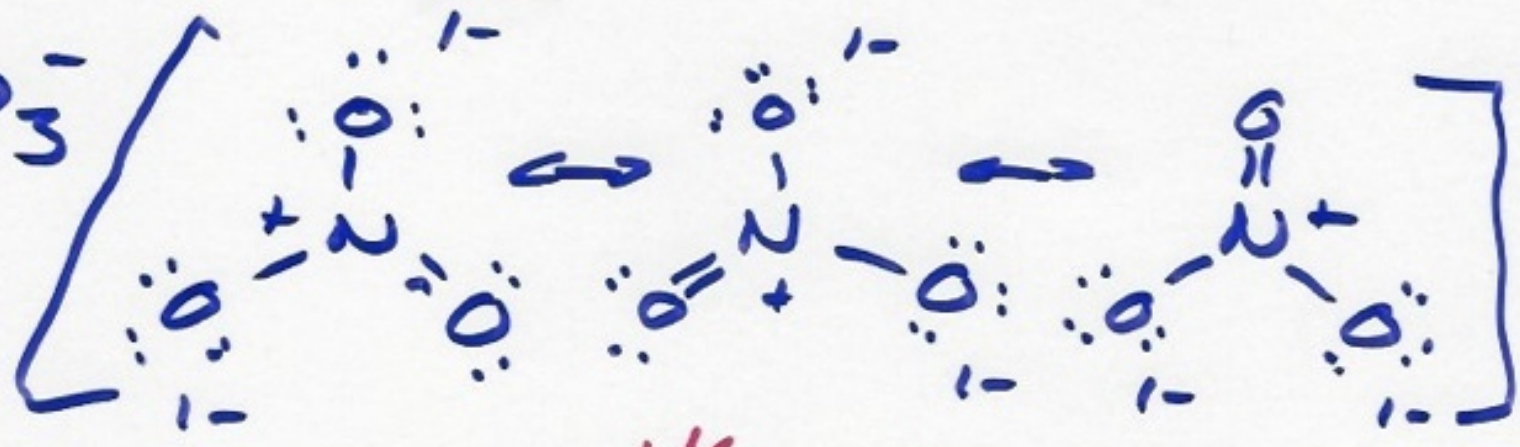
NO^+ $\quad :N\equiv O:^{+1}$ — shortest

3 pair

NO_2^-

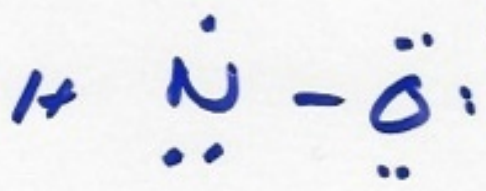


NO_3^-

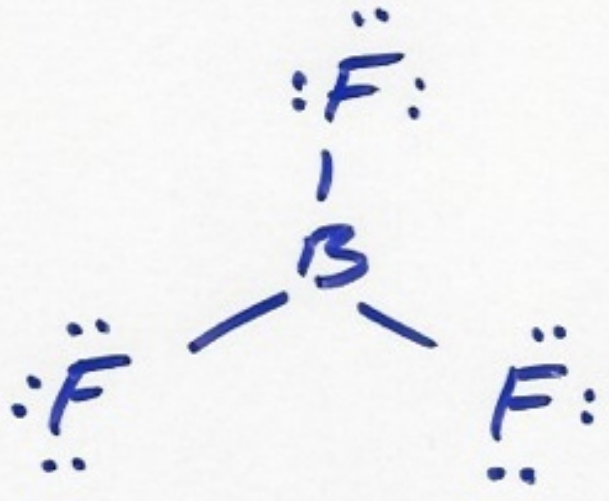


64

a. $\begin{array}{r} 11 \\ -2 \\ \hline 9 \end{array}$

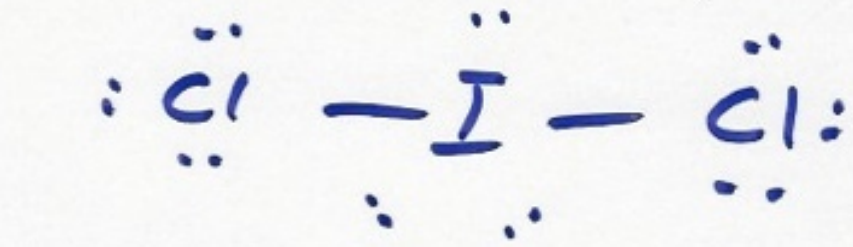


b. $\begin{array}{r} 24 \\ -6 \\ \hline 18 \end{array}$

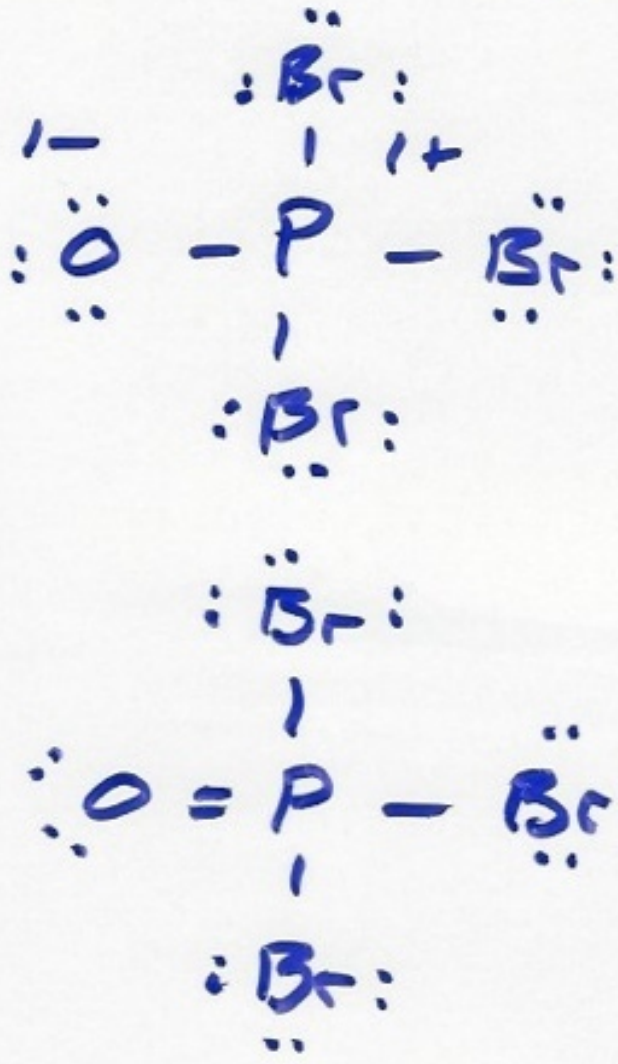


64

c. 22
- 4

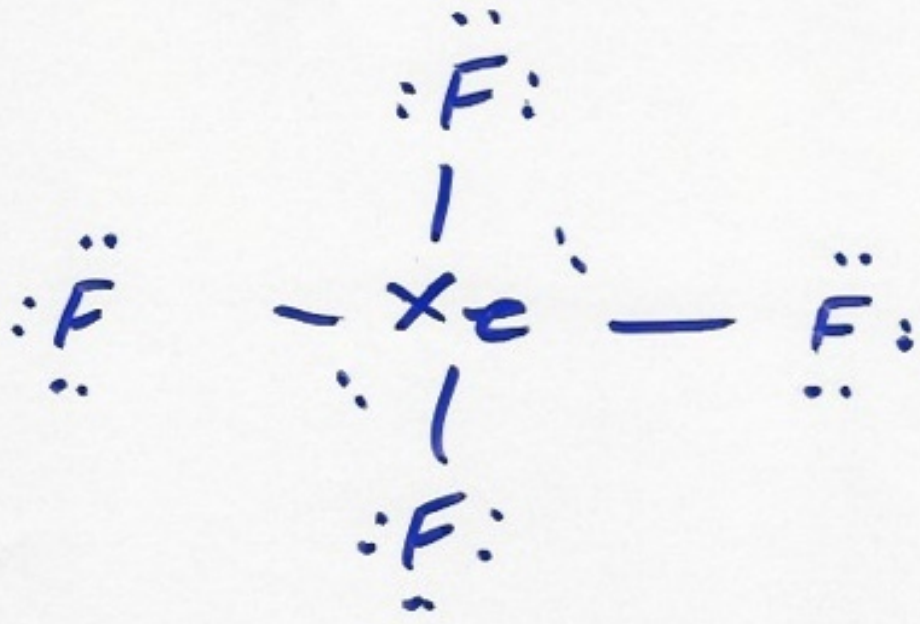


d. 32
- 8



No Formal charge

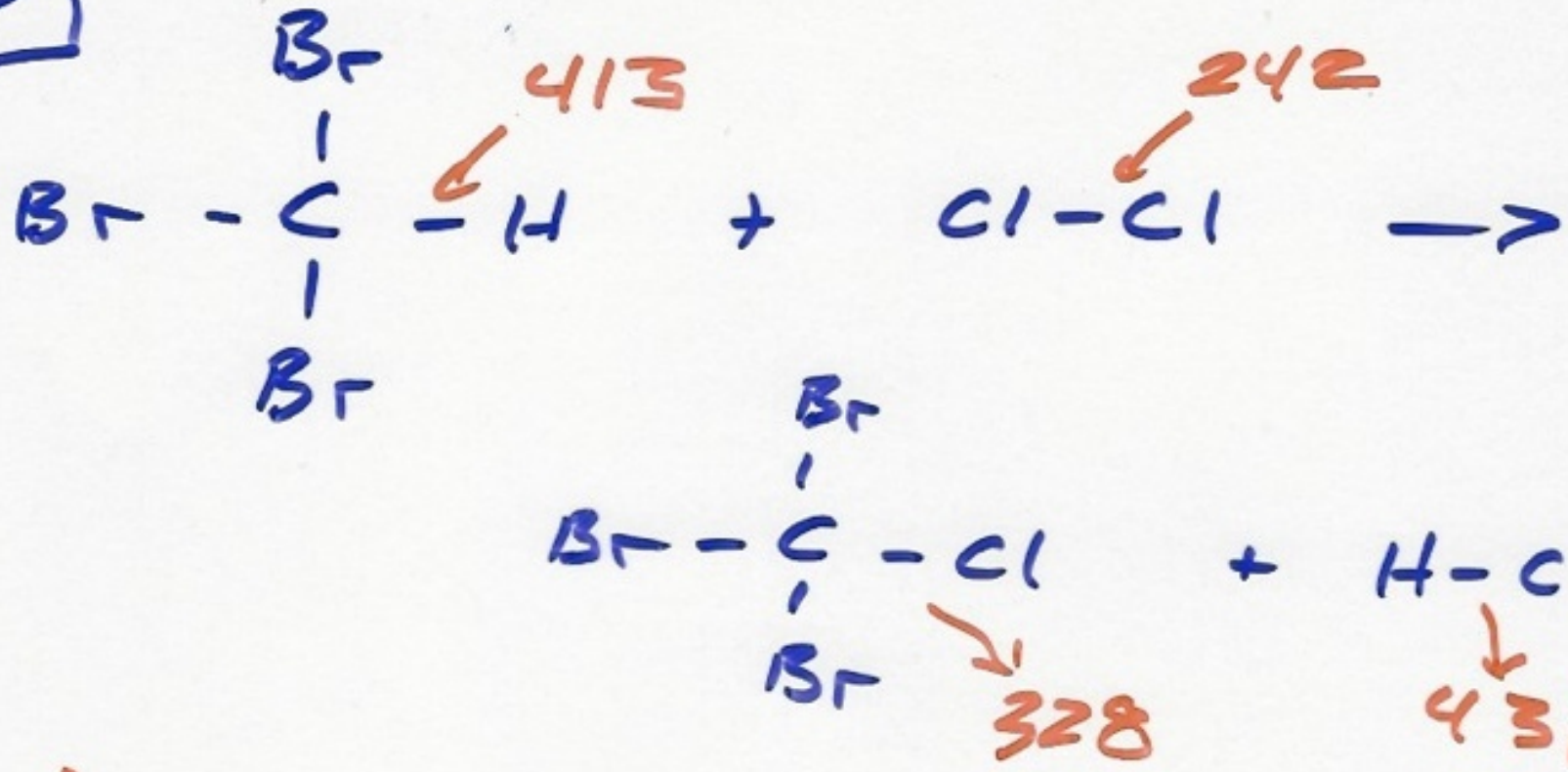
e.



36
- 8

70

a.



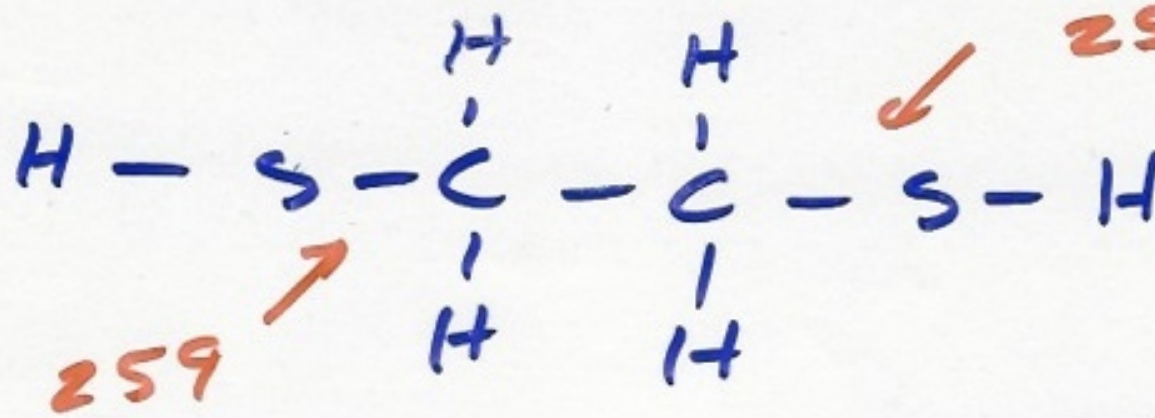
$= [413\,kJ + 242\,kJ] -$

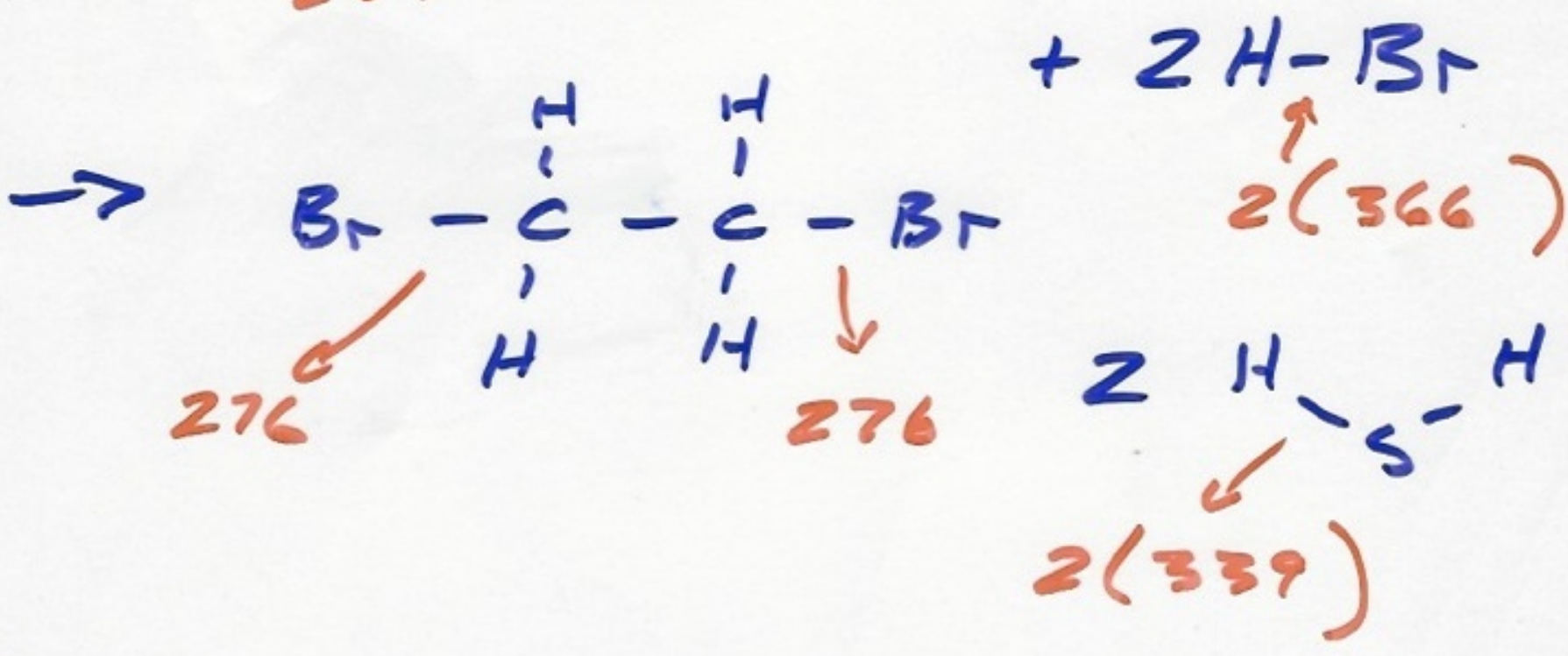
$[431\,kJ + 328\,kJ]$

$\Delta H_{rxn} = -104\,kJ$

70

b.



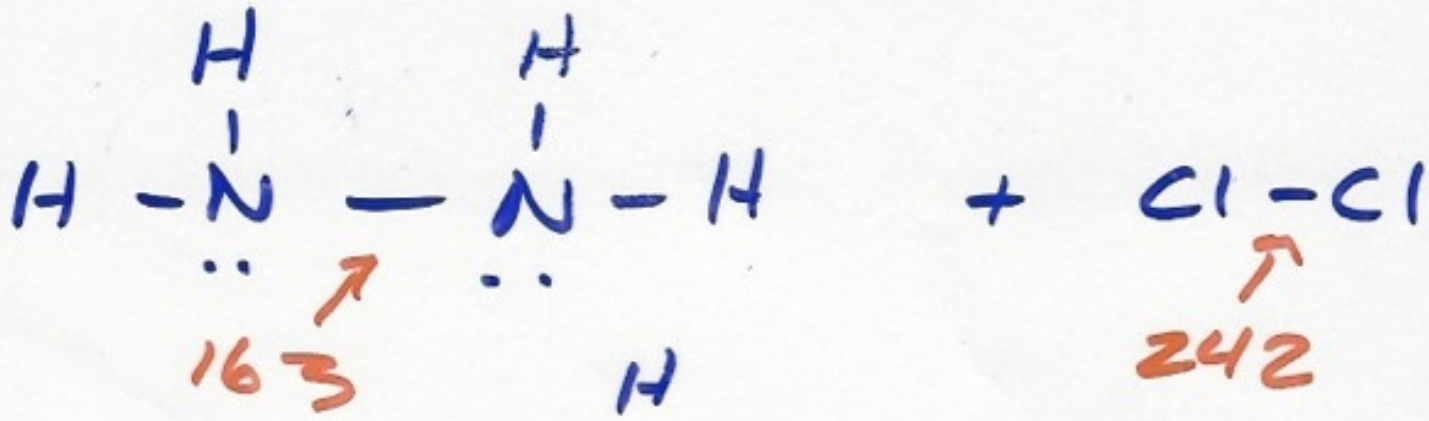


$$\left[\, 2(259\,kJ) + 2(366\,kJ) \,\right] - \left[\, 2(276\,kJ) + 2(339\,kJ) \,\right]$$

$$\Delta H_{rxn} = 20\,kJ$$

70

C.

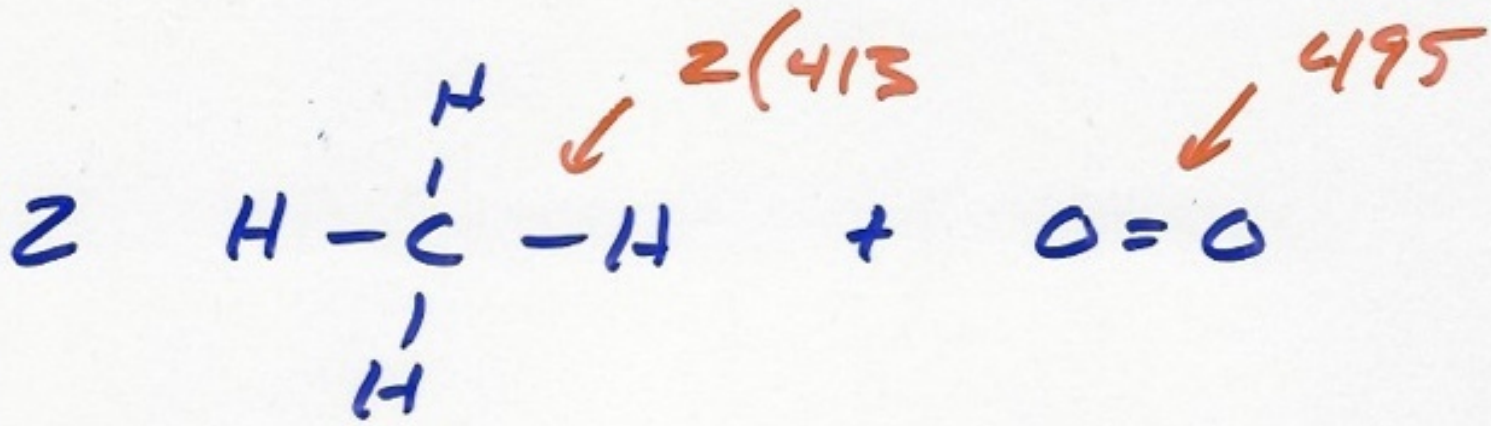


$$[163\,kJ + 242\,kJ] - [2(200\,kJ)]$$

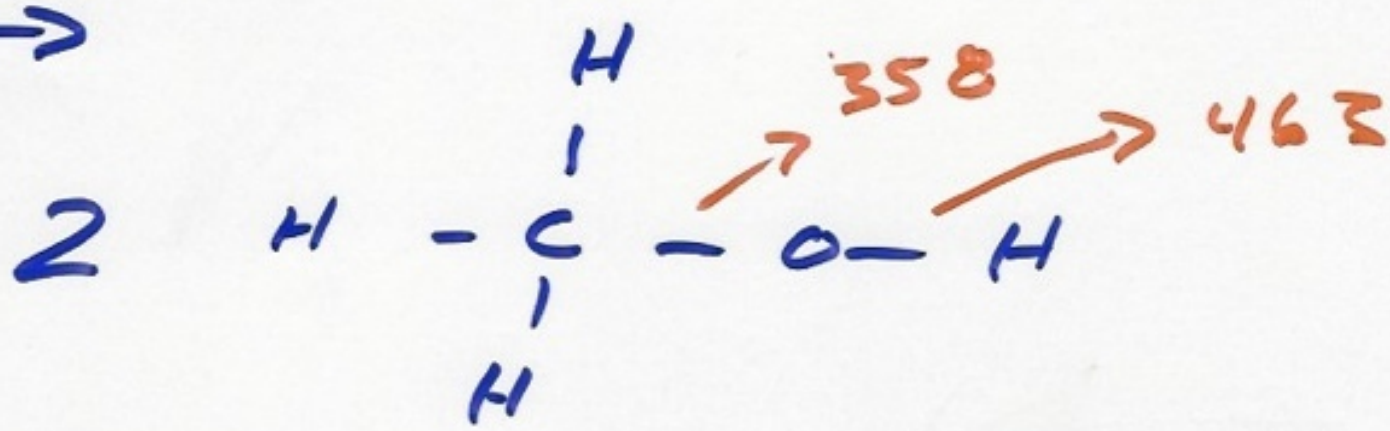
$$\Delta H^{\circ}_{rxn} = 5\,kJ$$

71

a.



→



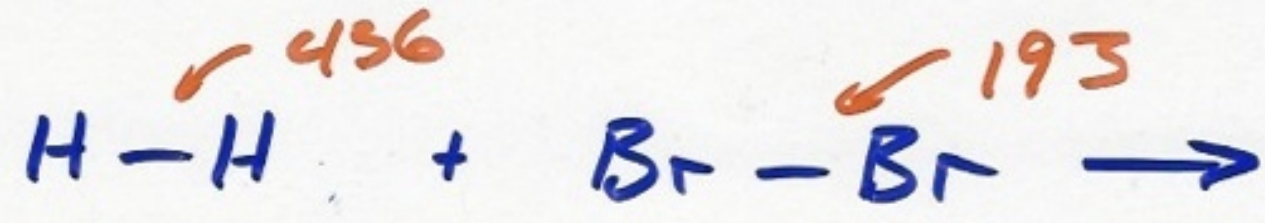
$[2(413kJ) + 495kJ] -$

$[2(358kJ) + 2(463kJ)]$

$\Delta H = -321\ kJ$

71

b.

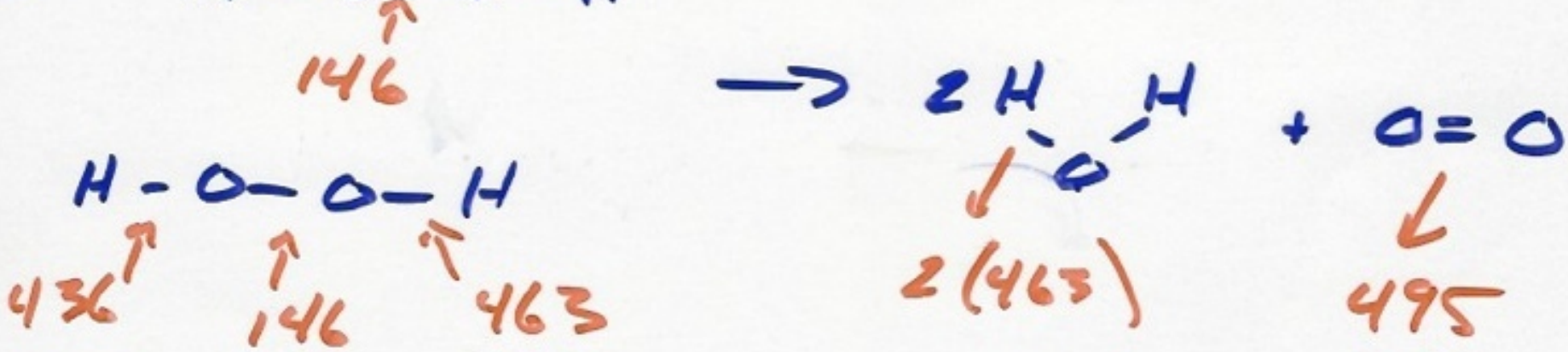


$$[436 + 193] - [2(366)]$$

$$\Delta H = -321\ kJ$$

---

c.



$$[2(146) + 2(463)] -$$

$$[2(463) + 495]$$

$$\Delta H^\circ = -203\ kJ$$