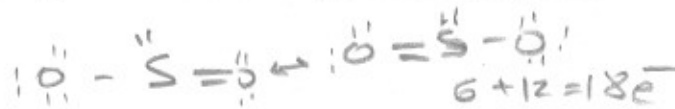


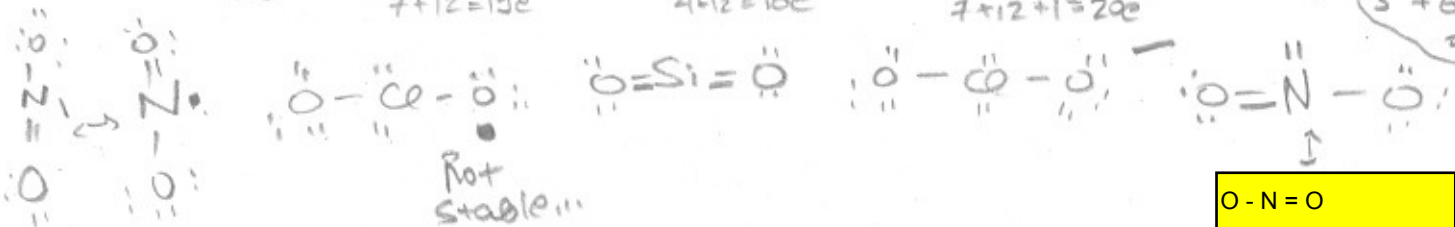
SHOW ALL THE explanations asked.

Put letter answer in the space provided next to each question.



2pt E 1. Which one of the following species would have a Lewis structure(s) most like that of sulfur dioxide, SO₂?
 (Show all Lewis structures first)

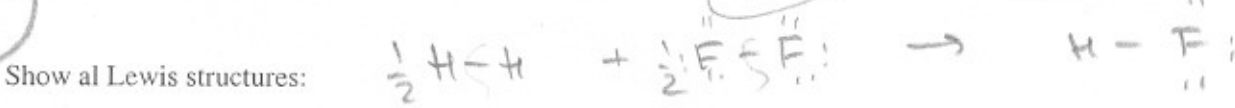
- a. NO₂ → 17e⁻ b. ClO₂ 7+12=19e⁻ c. SiO₂ 4+12=16e⁻ d. ClO₂⁻ 7+12+1=20e⁻ e. NO₂⁻ 5+6*2+1=18e⁻



O-N=O

D 2. The bond energies for H₂(g) and HF(g) are 435 and 565 kJ/mol, respectively. bond energy of F₂ is 159 kJ/mol. What is the heat of reaction (also called enthalpy of the reaction, delta H):

- 3pt** a. -80 b. 80 c. 138 d. -268 e. 268



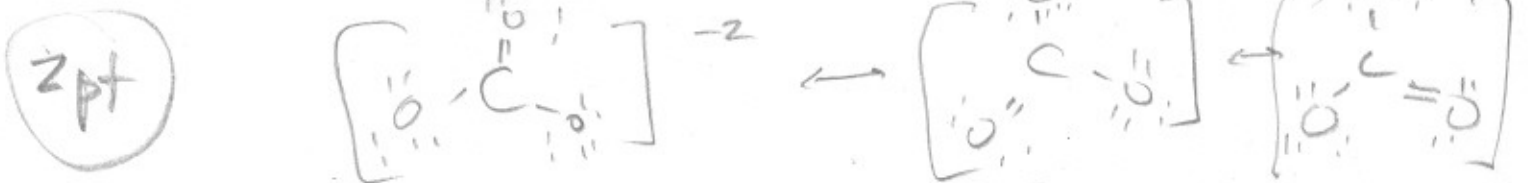
Bonds broken (total energy) $\frac{1}{2} \text{HH} (435) + \frac{1}{2} \text{F-F} (159)$

Bonds made (total energy): $- (\text{H-F}) - 565$

Heat of reaction calculation: $\Delta H = \frac{1}{2} 435 + \frac{1}{2} 159 - 565 = -268 \frac{\text{kJ}}{\text{mol}}$

Is the reaction EXOTHERMIC or ENDOTHERMIC? -----

D 3. Sketch the Lewis structure and molecular geometry for the [CO₃]²⁻ ion (carbonate).



Is C-O bond order in this ion: A) 1 B) 2 C) 3 D) between 1 and 2

a 4. Which of the following species has the shortest bond distance?

- a. CO b. NO⁻ c. O₂ d. F₂ e. Cl₂

(Hint: draw Lewis structure for each and figure out Bond Order in each case! If needed - consider relative atomic radii)



grader _____

points lost _____