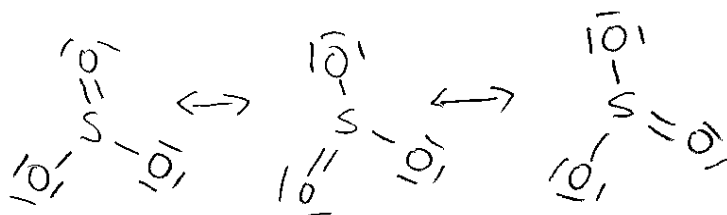


Name KEY Rec. Instr. _____

Two-Digit Section No. _____ Lab. Instr. _____

1. [10 points] Draw the resonance forms for
- SO_3
- and choose the most representative form(s).

$$6 + 3(6) = 24e^- / 12 \text{ pairs}$$



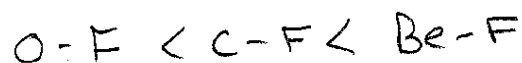
all are
equally
representative

2. [5 points] Order the following bonds from lowest to highest polarity.

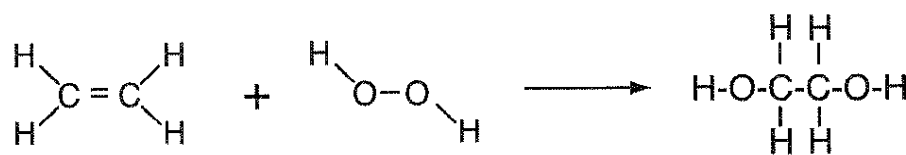
C-F

O-F

Be-F



3. [15 points] Estimate the
- ΔH
- for the reaction



using $D_{\text{C-H}} = 413$ kJ/mole, $D_{\text{C-C}} = 348$ kJ/mole, $D_{\text{C=C}} = 614$ kJ/mole, $D_{\text{O-H}} = 463$ kJ/mole, $D_{\text{C-O}} = 358$ kJ/mole, and $D_{\text{O-O}} = 146$ kJ/mole.

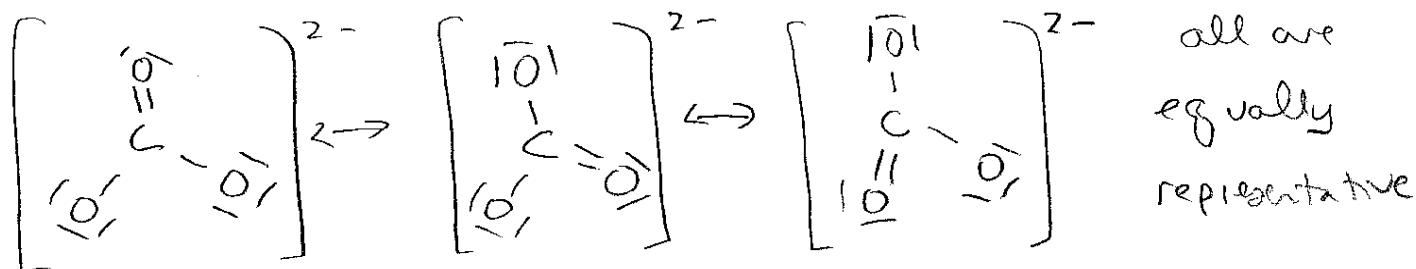
$$\begin{aligned} \Delta H &= (D_{\text{C=C}} + 4D_{\text{C-H}} + 2D_{\text{O-H}} + D_{\text{O-O}}) - (4D_{\text{C-H}} + D_{\text{C-C}} + 2D_{\text{C-O}} + 2D_{\text{O-H}}) \\ &= D_{\text{C=C}} + D_{\text{O-O}} - D_{\text{C-C}} - 2D_{\text{C-O}} \\ &= 614 + 146 - 348 - 2(358) = -304 \text{ kJ/mole.} \end{aligned}$$

Name KEY Rec. Instr. _____

Two-Digit Section No. _____ Lab. Instr. _____

1. [10 points] Draw the resonance forms for
- CO_3^{2-}
- and choose the most representative form(s).

$$4 + 3(6) - 2 = 24 e^- / 12 \text{ pairs}$$



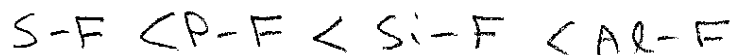
2. [5 points] Order the following bonds from lowest to highest polarity.

P-F

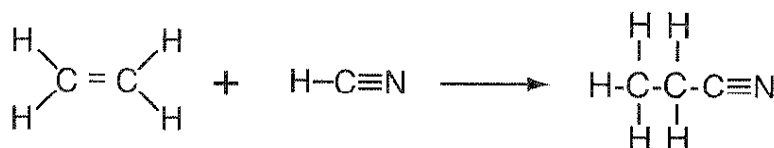
Si-F

Al-F

S-F



3. [15 points] Estimate the
- ΔH
- for the reaction

using $D_{\text{C-H}} = 413 \text{ kJ/mole}$, $D_{\text{C=C}} = 614 \text{ kJ/mole}$, $D_{\text{C-C}} = 348 \text{ kJ/mole}$, $D_{\text{C}\equiv\text{N}} = 891 \text{ kJ/mole}$.

$$\Delta H = (5 D_{\text{C-H}} + D_{\text{C=C}} + D_{\text{C}\equiv\text{N}}) - (5 D_{\text{C-H}} + 2 D_{\text{C-C}} + D_{\text{C}\equiv\text{N}})$$

$$\begin{aligned} \Delta H &= D_{\text{C=C}} - 2 D_{\text{C-C}} = 614 \text{ kJ/mole} - 2(348 \text{ kJ/mole}) \\ &= -82 \text{ kJ/mole} \end{aligned}$$