

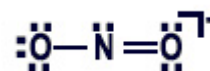
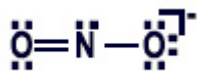
Question 7

6 Points

(4 Points)

The following questions all relate to NO_2^-

1. The molecule has **two** resonance structure. Draw them.



(2 Points)

2. The N to O **bond length** in pm is best described as: (Circle the best choice)

- a) = 136 b) > 136 c) = 115 d) **>115** e) <115

Question 8

4 Points

The **formal charge** on the carbon and nitrogen atoms in CN^- are:

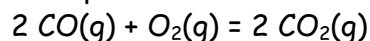
C: **-1**

N: **0**

Question 9

6 Points

Methane when combusted produces carbon dioxide and water according to:



Estimate the amount of **energy** produced upon the combustion of **1 mole** of CO ?

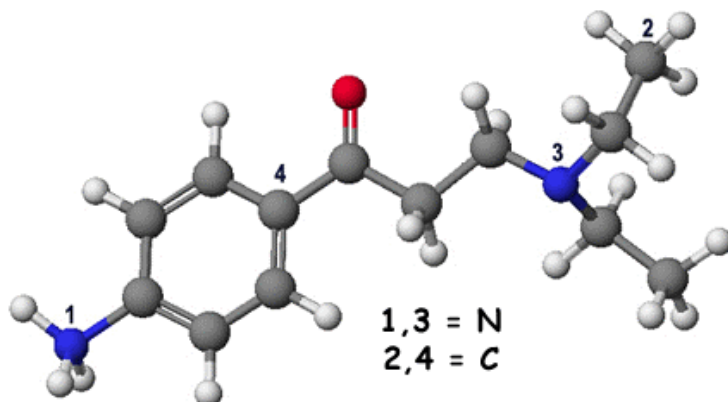


$$2(\text{C}\equiv\text{O}) + \text{O}=\text{O} - 4(\text{C}=\text{O})$$

$$2(1075) + 498 - 4(803) = \mathbf{-564/2 \text{ kJ}}$$

Question 10

4 Points

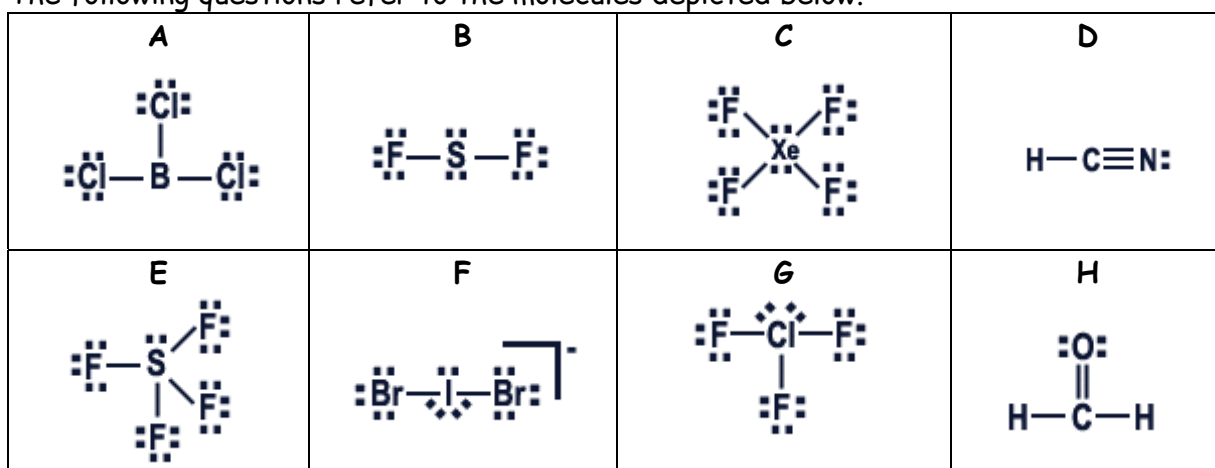


What is the **bond angle** about the **numbered** atoms?

1. **109**
2. **109**
3. **109**
4. **120**

Question 11 The following questions refer to the molecules depicted below.

34 Points



- List the **structure(s)** whose only bond angle is $\sim 180^\circ$ D, F
- List the **structures(s)** whose **epg** is/are **trigonal planar**: A, H
- Give the **electron pair geometry (epg)** for:

B: Tetrahedron	C: Octahedron
F: Trigonal bipyramid	G: Trigonal bipyramid
- Give the **molecular geometry** for:

B: Angular (109)	C: Square planar
E: See-saw	G: T-shaped
- Label the following molecules as either **polar (P)** or **non polar (NP)**

A: NP	B: P	C: NP	D: P	F: NP
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Question 12 A hypothetical molecule has the formula AB_3C_2 , where **A** is the **central atom** and **B** and **C** are elements belonging to the **same group**. The molecule has a **trigonal bipyramid electron pair geometry** and is **polar**. What could you infer about the **atomic weight** of **C** versus that of **B**?

4 Points

(1 Point)

Atomic weight of C > B

In three sentences or less justify your reasoning.

(3 Points)

In a trigonal bipyramid geometry, the larger molecules prefer the trigonal planar area. If B were the largest, then they would occupy this area and the molecule would be Non-polar. The fact that its polar means that the C's occupy the trigonal planar area.

Question 13 The order (**most soluble to least soluble**) of **solubility in water** for the following molecules is:
4 Points



(2 Points) What would you anticipate the order to be (**most soluble to least soluble**) in carbon tetrachloride, **CCl₄**



(2 Points) In two sentences or less, justify your choice.

Solubility - Like dissolves in like. The order given is in water (polar solvent). CCl₄ is a non-polar solvent, thus the solubility would be reversed.

Do Not Write Below This Line

Exam II Score

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