Question 1 (10 Points) Using noble gas notation, write the electron configuration for the following:

1. Co $[Ar]4s^2 3d^7$
2. Cu $[Ar]4s^1 3d_{10}$
3. Fe^{3+} $[Ar]3d^5$
4. I^- $[Xe]$ or $[Kr]5s^2 4d^{10} 5p^6$
5. Dy $[Xe]6s^2 4f^{10}$ *(Dy = Element 66)*

Question 2 (5 Points) Arrange the following elements in order of **increasing size**, by ranking then from 1 (**smallest**) to 5 (**largest**)

Cs	5	Ba	4	Si	2
Ga	3	N	1		

Question 3 (5 Points) Arrange the following elements in order of **ionization energy**, by ranking then from 1 (**greatest**) to 5 (**smallest**)

N	1	Si	2	K	5
Al	3	Ca	4		

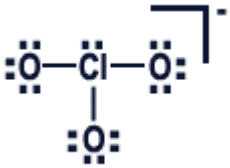
Question 4 (5 Points) Arrange the following elements in order of **metallic character**, by ranking then from 1 (**smallest**) to 5 (**greatest**)

N	1	Si	2	K	5
Al	3	Ca	4		

Question 5 (15 Points) Draw the **best** Lewis Dot structure for the following

N_2

ClO_3^-



$BeCl_2$

XeF_4

HCN

Question 6 (12 Points) The following questions all relate to **Ozone**, O_3

1. The molecule has **two** resonance structure. Draw them. (6 Points)

2. The bond *O-O-O* **bond angle** is approximately: **120** (3 Points)

3. The *O* to *O* **bond energy** in kJ per mole is: (**Circle the best choice**) (3 Points)

a) = 498 b) > 498 c) = 138 **d) >138** e) <138

Question 7 (6 Points) The **formal charge** on the carbon and oxygen atoms in ***CO*** are:

C: **-1** *O*: **+1**

Question 8 (6 Points) Methane when combusted produces carbon dioxide and water according to:

$$CH_4(g) + 2O_2 = CO_2(g) + 2H_2O(g)$$

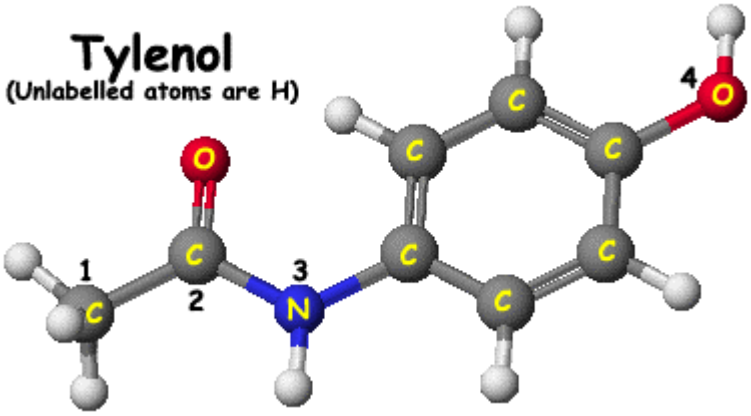
Estimate the amount of **energy** produced upon the combustion of **1 mole** of CH_4?

Bonds Broken – Bonds Formed

4(*C*-H) + 2(*O*=*O*) – 2(*C*=*O*) – 4(*O*-H)

4(414) + 2(498) – 2(803) – 4(464) = **-810 kJ**

Question 9 (8 Points)

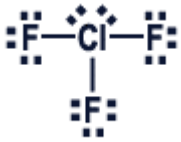
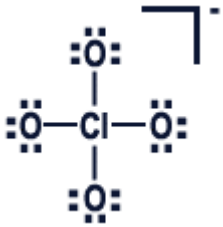
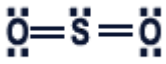
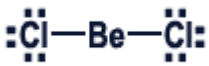


What is the **bond angle** about the **numbered** atoms?

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

Question 10
28 Points

The following questions refer to the molecules depicted below.

A	B	C	D
			
E	**F**	**G**	**H**
			

1. List the **structure(s)** whose only bond angle is **~180^0** D, H
2. List the **structures(s)** whose **epg** is/are **tetrahedral**: B, F
3. Give the **electron pair geometry** (**epg**) for:

   A: Trigonal bipyramid C: Trigonal planar

   D: Linear F: Tetrahedron
4. Give the **molecular geometry** for:

   A: T-shaped E: See saw

   G: Trigonal bipyramid H: Linear
5. **Two** of the above molecules have an **angular/bent** molecular geometry. They are: C and F. Which one has the **largest** bond angle? C
6. Label the following molecules as either **polar (P)** or **non polar (NP)**

   A: P C: P D: NP F: P H: NP

Do Not Write Below This Line

Exam II Score	