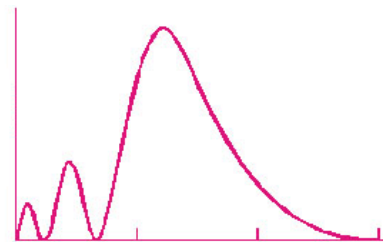


Question 1
4 Points

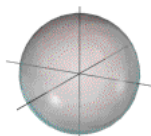


a) The orbital depicted on the left is what type of orbital? d

b) Based on its Radial Distribution depicted on the right you can label this orbital as? 5d



Question 2
4 Points



(a)



(b)

a) Which of the orbitals depicted has the highest n value? a

b) Which of the orbitals depicted has the greatest force of attraction? b

Question 3
8 Points

Write the complete electron configuration for the following

a) P: $1s^2 2s^2 2p^6 3s^2 3p^3$

c) Al^{3+} : $1s^2 2s^2 2p^6$

b) Sc: $1s^2 2s^2 2p^6 3s^2 3p^6 4s^2 3d^1$

d) S^{2-} : $1s^2 2s^2 2p^6 3s^2 3p^6$

Question 4
6 Points

Using Noble Gas notation write the electron configuration for

a) Xe: $[Kr] 5s^2 4d^{10} 5p^6$

c) Zn^{2+} : $[Ar] 3d^{10}$

b) Cu: $[Ar] 4s^1 3d^{10}$

Question 5
3 Points

The element with electronic configuration, $[Ar]4s^2 3d^{10} 4p^5$, has 7 valence electrons.

Question 6
3 Points

How many diamagnetic elements would you expect in period 6? 4

Question 7
5 Points

Using only the periodic table given with this exam rank the following elements from 1 to 5 in order of increasing ionization energy (1 being the smallest ionization energy and 5 the largest ionization energy).

4 B 2 Ca 5 N 1 Rb 3 Ga

Question 8
3 Points

Li, Na and K belong to group IA and as we know like to lose an electron. However if one of these were to gain an electron which one would it most likely be?

Li

Question 9
2 Points

The Lewis diagram on the right represents the valence electron configuration of a main-group element. If this element is in period 4, its valence electron configuration is?



$[Ar] 4s^2 3d^{10} 4p^4$

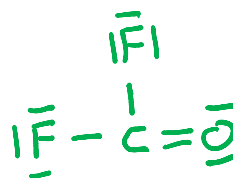
Question 10
12 Points

Draw the **best** Lewis Dot structure for the following molecules.

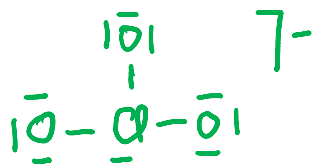
CO



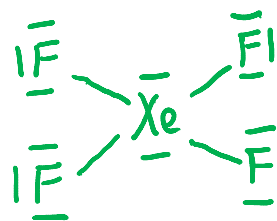
F₂CO



ClO₃⁻ (Cl = Chlorine)



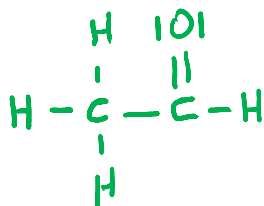
XeF₄



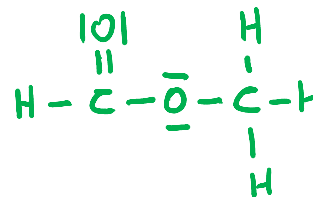
Question 11
8 Points

Draw the **best** Lewis Dot structure for the following **organic** molecules.

CH₃COH

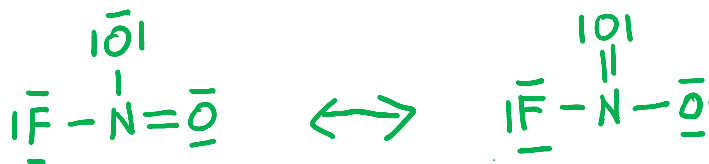


HCOOCH₃



Question 12
8 Points

Draw all **reasonable** resonance structures for NO₂F



Circle the best answer:

Average bond lengths is given on the back of the Periodic Table accompanying this exam.

The N to O bond length in pm is expected to be:

1. = 136pm

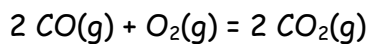
2. < 115pm

3. = 115pm

4. > 115pm

Question 13
4 Points

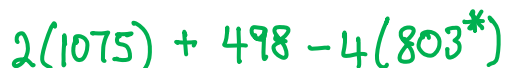
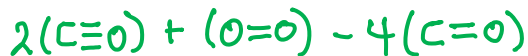
Using **average bond energies** (given on the front of this exam), **estimate the enthalpy change** for the following reaction:



Show Work



Σ Bonds Broken - Σ Bonds Formed



$$2648 - 3212$$

* Not 745

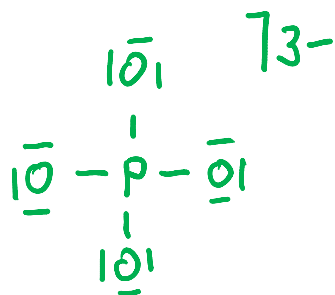
$$\Delta H^\circ_{\text{Reaction}} = \boxed{-564} \text{ kJ}$$

Question 14
6 Points

Draw Lewis Structures for PO_4^{3-} in which

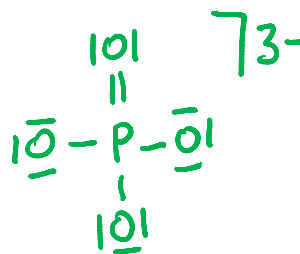
- The **Octet Rule** is **satisfied** on **all** the atoms.
- The central **Phosphorus** atom has a **formal charge of zero**.

a) Octet Rule satisfied on all the atoms.



$$\text{O}: 6 - 6 - \frac{1}{2}(2) = -1$$

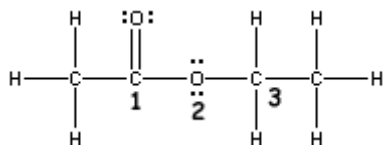
b) Phosphorus a formal charge of zero



$$\text{P} = 5 - 0 - \frac{1}{2}(10) = 0$$

c) What is the **formal charge** on the **oxygen atoms** in a): -1

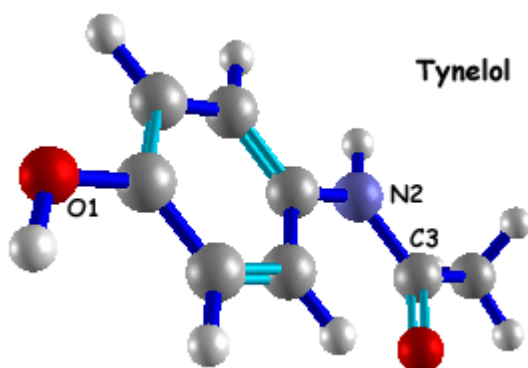
Question 15
4 Points



a) The **predicted bond angle** about **1** is: 120°

b) The **predicted bond angle** about **2** is: ~109°

Question 16
6 Points



What is the **predicted bond angle** about the atoms indicated on Tylenol:

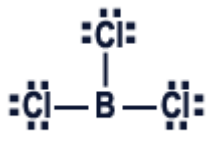


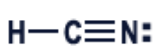



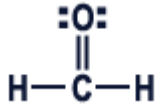
a) **Oxygen 1**: ~109°

b) **Nitrogen 2**: ~109°

c) **Carbon 3**: 120°

Question 17
14 Points

The following questions refer to the **Lewis Structures** for the molecules depicted below.

 <p>A</p>	 <p>B</p>	 <p>C</p>	 <p>D</p>
 <p>E</p>	 <p>F</p>	 <p>G</p>	 <p>H</p>

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

D, F

A, H

B: TETRAHEDRON

C: OCTAHEDRON

F: TRIGONAL BIPYRAMID

- Give the **molecular geometry** for:

C: SQUARE PLANAR

E: SEE-SAW

Do Not Write Below This

Exam II Score