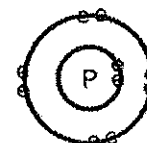
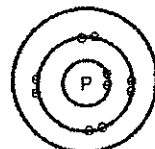
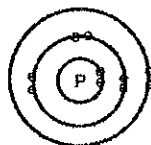
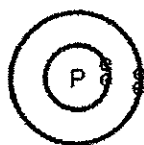


Electronic structure: Practice questions/self check

Multiple Choice

Identify the letter of the choice that best completes the statement or answers the question.

- _____ 1. How many electrons in a ground-state As atom in the gas phase have quantum numbers $n = 3$ and $l = 1$?
 a. 1
 b. 2
 c. 3
 d. 6
- _____ 2. What is the electron configuration of the Al^{3+} ion?
 a. $1s^2 2s^2 2p^6$
 b. $1s^2 2s^2 2p^6 3s^2 3p^1$
 c. $1s^2 2s^2 2p^6 3s^2 3p^4$
 d. $1s^2 2s^2 2p^6 3s^2 3p^6$
- _____ 3. Which of the following electron configurations is representative of Hund's rule?
 a. $1s^2 2s^2 2p^6$
 b. $1s^2 2s^2 2p^6 3s^2 3p^1$
 c. $1s^2 2s^2 2p^6 3s^2 3p^4$
 d. $1s^2 2s^2 2p^6 3s^2 3p^6$
- _____ 4. Which of the following would accurately represent Fe^{2+} ?
 a. $1s^2 2s^2 2p^6$
 b. $1s^2 2s^2 2p^6 3s^2 3p^6$
 c. $1s^2 2s^2 2p^6 3s^2 3p^6 4s^2 3d^4$
 d. $1s^2 2s^2 2p^6 3s^2 3p^6 3d^6$
- _____ 5. Which of the following would accurately represent an excited state atom?
 a. $1s^2 2s^2 2p^6 2d^2$
 b. $1s^2 2s^2 2p^6 3p^6 4s^2$
 c. $1s^2 2s^2 2p^6 3s^2 3p^6 4s^2 3d^4$
 d. $1s^2 2s^2 2p^6 3s^2 3p^6 4s^2$
- _____ 6. Which of the following Bohr diagrams is consistent with the most common ion of Magnesium?



a.

b.

c.

d.

7. The name of the most common charge for the nitrogen atom is _____ with a charge of _____.

- a. Nitride/0
 b. Nitrogen/+3

- c. Nitride/ N^{-3}
 d. Nitrogen/ N_2



8. How would you describe the identified object?

- a. 2s electron
 b. 3s electron

- c. 3p electron
 d. 3s or 3p electron

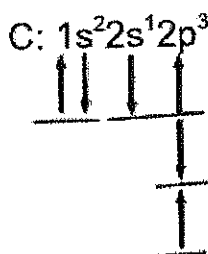
9. Which of the following is a correct reaction for the formation of Al^{3+} ?

- a. $Al + 3e^- \Rightarrow Al^{3+}$
 b. $Al^{3+} + 3e^- \Rightarrow Al$

- c. $Al \Rightarrow Al^{3+} + 3e^-$
 d. $Al \Rightarrow Al^{2+} + 2e^-$

mod 2 does not show but, atom will follow wst outer 4e-

Name: _____



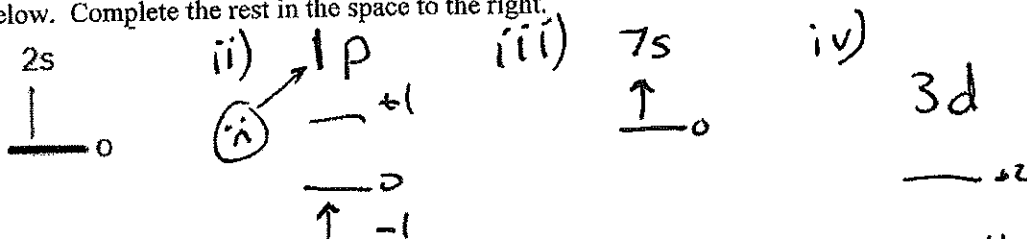
Listed here is an accurate model of a carbon atom

10. In the P orbital there are both up and down arrows. Which of the following statement is true?
- Up arrows are lower in energy then down arrows so they happen in nature.
 - Down arrows are equal in energy to up arrows but they do occur more frequently.
 - Down arrows are higher in energy then up arrows but occur randomly up and down.
 - All arrows are equal in energy but when up and down arrows are together energy is lower
11. Some scientists actually think the model above is the lowest energy state(ground state) of the carbon atom due to the fact that it bonds 4 times. Which of the following might justify this statement.
- The electron filling the p orbital over the s orbital must be a lower energy state
 - Due to Hund's rule the atom will bump up an electron into a higher excited state.
 - The model is in error, the atom actually has the s orbital full and will only bond 2 times.
 - The model is correct but due only to the Pauli exclusion principle.

12. Below you will find 4 options. Select 1 of these.

- $n=2, l=0, m(l)=0$ spin = +1/2
- $n=1, l=1, m(l)=-1$ spin = +1/2
- $n=7, l=0, m(l)=0$ spin = +1/2
- $n=3, l=2, m(l)=-2$ spin = +1/2

a. For each of these create an orbital diagram showing the electron in question. I have "i" done for you below. Complete the rest in the space to the right.



b. Which of these quantum numbers above is not legitimate?

b. Which of these would be a transition metal?

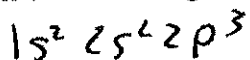
c. Which of these could be an alkali metal?

d. Which of these could be describing the valence electron of Radon?

Handwritten notes: iii ← best option

Name: _____

13. a. Write the electron configuration for nitrogen.



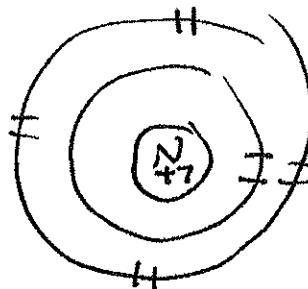
b. How many valence electrons does nitrogen have?

5

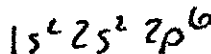
c. What is the common charge for nitrogen?

-3

d. Draw out a Bohr diagram for nitride.

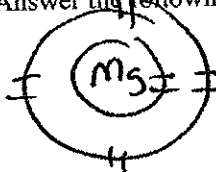


e. Write out an electron configuration of nitride.

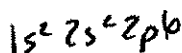


14. Epsom Salts is the common name for magnesium Sulphate. This is an ionic compound forming a bulk crystal of Magnesium and sulphate ions. Answer the following questions relative to the magnesium ion.

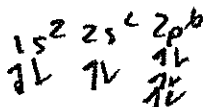
a. Bohr diagram.



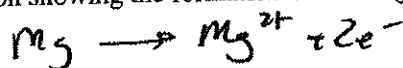
b. Electron configuration.



c. Orbital diagram:



d. Write out the reaction showing the formation of the magnesium ion from the magnesium atom.

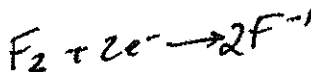


e. Provide the value(range of values) for each quantum number for the valence electron of Mg^{2+} : $n = 2 \quad l = 1 \quad l_m = 0 \quad l_s = +\frac{1}{2} \quad -\frac{1}{2}$

Mg: $n = 3 \quad l = 0 \quad l_m = 0 \quad l_s = +\frac{1}{2} \quad -\frac{1}{2}$

15. Fluorine reduced to form an anion.

1. Write out the reaction for this process.



2. Is this process exothermic or endothermic?

energy released when bonds formed

3. If you were using fluorine as a oxidizing agent (reducer) what other element might work if you ran out of fluorine.

some element in same family.

4. Draw a Bohr diagram of fluoride.

