

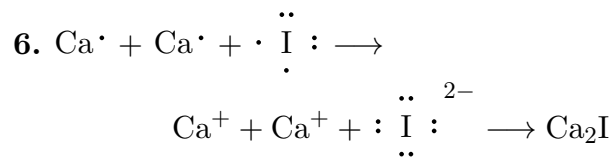
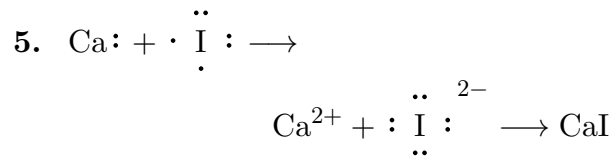
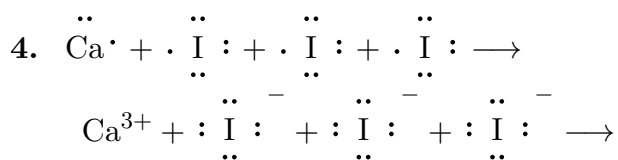
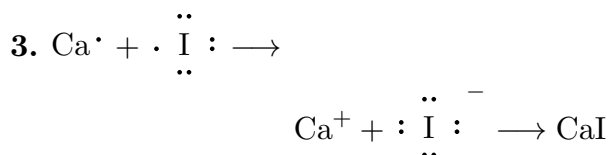
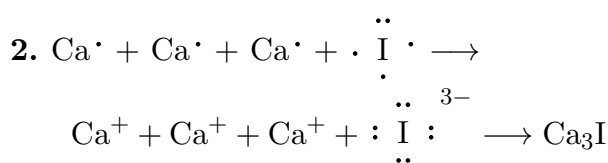
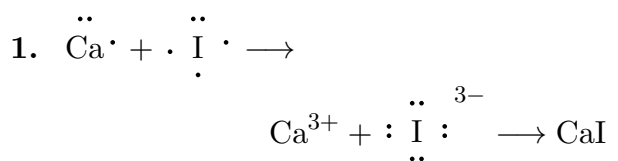
This print-out should have 25 questions. Multiple-choice questions may continue on the next column or page – find all choices before answering.

Important Message: Please please please remember to CORRECTLY bubble in your name, utetid, and version number for your exam. We are averaging about 20 students who fail to do this. Think of it as the easiest question on the exam. If you get it wrong, you'll get a zero when we grade it. Because Quest is not that user friendly, it will take at least 24 hours to get your avoidable mistake fixed. It is a huge pain in the ass - know that. Please take the time to bubble in your information carefully. Lets have NO mistakes on this information please. Thank you so much. I'm only putting this plea on this practice exam and not on the real exam. So just remember to do it.

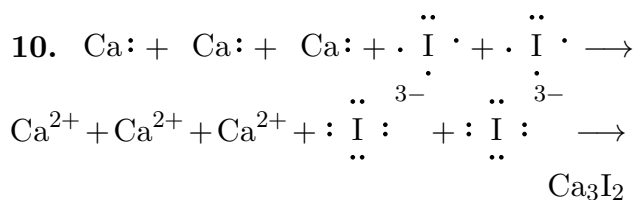
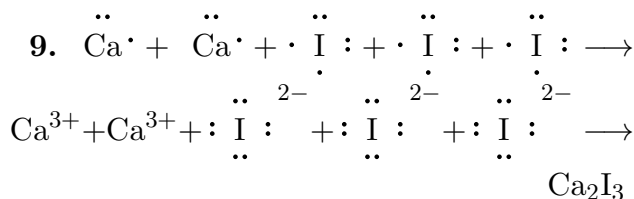
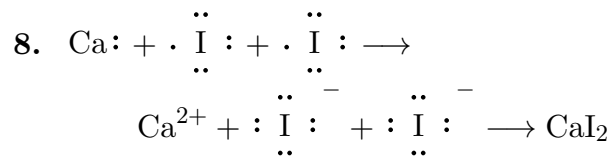
- Dr. McCord

Holt da 6 3 rev 2b
001 10.0 points

Use electron-dot notation to demonstrate the formation of ionic compounds involving the elements Ca and I.



7. None of these



Mlib 01 2023

002 10.0 points

Choose the pair of names and formulas that do NOT match.

1. N_2O_5 : dinitrogen pentoxide

2. As_4O_6 : tetraarsenic oxide

3. SO_3 : sulfur trioxide

4. Cl_2O_7 : dichlorine heptoxide

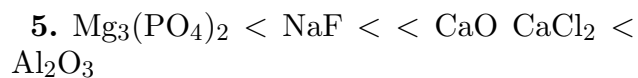
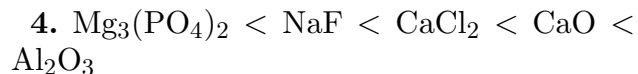
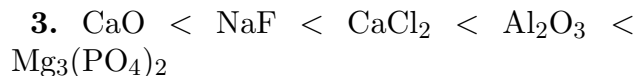
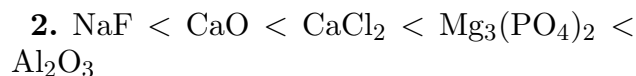
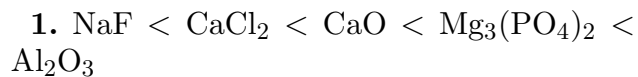
5. NO : nitrogen monoxide

LDE Rank Lattice Energy 004

003 10.0 points

Rank the crystal lattice energy of the salts Al_2O_3 , CaCl_2 , CaO , NaF , $\text{Mg}_3(\text{PO}_4)_2$

from least to greatest:



Campion 05 Ex 01 07

004 10.0 points

If the interaction energy between a sodium ion and a chloride ion in table salt is 760 kJ/mol, what is the interaction energy between a zinc ion (Zn²⁺) and a sulfide ion (S²⁻) in a hypothetical structure in which the inter-ionic distances are the same as that of NaCl?

1. 1140 kJ/mol

2. 1520 kJ/mol

3. 1.140 kJ/mol

4. 3040 kJ/mol

5. 760 kJ/mol

Internuclear Distance 1

005 10.0 points

Consider a potential energy diagram for the interaction of a sodium ion (Na⁺) with a chloride ion (Cl⁻). Which of the following statements is/are true?

I) Repulsive forces predominate at very small internuclear distances.

II) The minimum potential energy occurs when attractive forces are greatest.

III) Attractive forces are linearly dependent on the internuclear distance.

1. III only

2. I only

3. II and III

4. I and II

5. II only

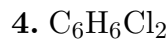
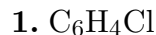
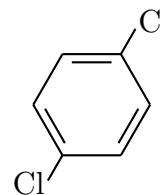
6. I and III

7. I, II and III

Line Drawing to Formula

006 10.0 points

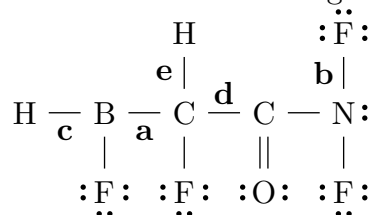
Determine the molecular formula for the molecule:



LDE Molecular Polarity 004

007 10.0 points

Consider the labeled bonds in the molecule below and rank them from least to most polar in terms of difference in electronegativity.



- $c < d < e < b < a$
- $d < c < a < e < b$
- $d < c < e < a < b$
- $a < b < c < d < e$
- $e < b < d < c < a$

Lewis CO dash**008 10.0 points**

Which of the following is the correct Lewis formula for carbon monoxide (CO)?

- $:O \equiv C:$
- $\overset{\cdot\cdot}{O} - \overset{\cdot\cdot}{C}:$
- $O - C$
- $:O - \overset{\cdot\cdot}{C}:$
- $\overset{\cdot\cdot}{O} - \overset{\cdot\cdot}{C}:$
- $\overset{\cdot\cdot}{O} - C:$
- $\overset{\cdot\cdot}{O} = \overset{\cdot\cdot}{C}:$
- $\overset{\cdot\cdot}{O} - \overset{\cdot\cdot}{C}:$
- $O - \overset{\cdot\cdot}{C}:$
- $\overset{\cdot\cdot}{O} - \overset{\cdot\cdot}{C}:$

Mlib 03 1055**009 10.0 points**

What kind of carbon-carbon bond is in a molecule of ethylene (C₂H₄)?

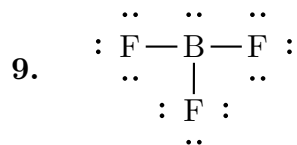
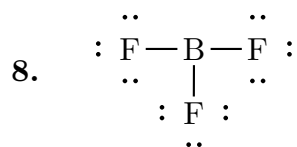
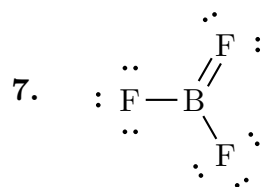
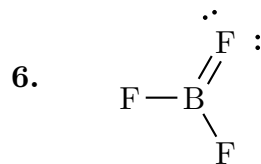
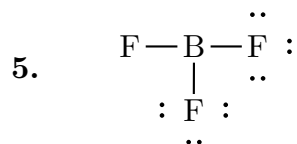
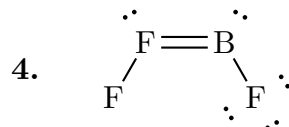
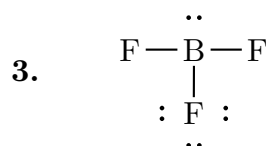
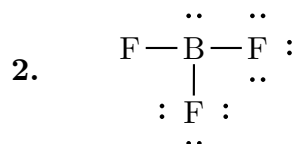
- single
- ionic
- triple

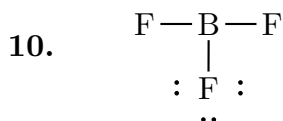
- double

Lewis BF₃ dash**010 10.0 points**

Which of the following is the correct Lewis formula for boron trifluoride (BF₃)?

- $F - F \equiv B - F$





ChemPrin3e T02 23
011 10.0 points

Draw the Lewis structure of xenon difluoride and give the number of lone pairs of electrons around the central atom.

1. 1
2. 5
3. 2
4. 4
5. 3

LDE Resonant Species 002
012 10.0 points

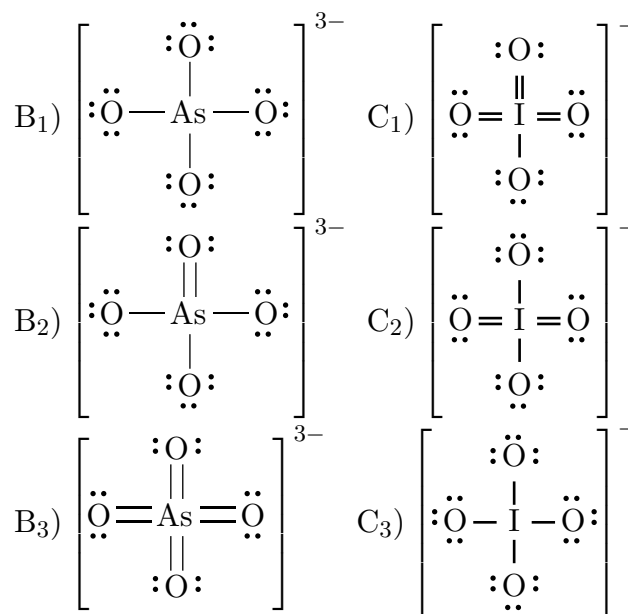
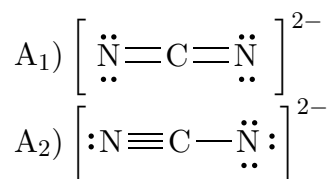
Which of the following species exhibit resonance/delocalization?

- I) HCN
II) O₃
III) CO₃²⁻

1. I only
2. I, II
3. III only
4. I, II, III
5. II only
6. II, III
7. I, III

ChemPrin3e 02 46
013 10.0 points

Consider the following sets A, B, and C



of ions.

Determine the formal charge on each atom and identify the structure of lowest energy for each set A, B, and C.

1. A₁, B₁, C₁
2. A₁, B₂, C₃
3. A₂, B₃, C₃
4. A₂, B₃, C₂
5. A₁, B₂, C₁
6. A₂, B₂, C₂

ChemPrin3e T03 26
014 10.0 points

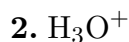
Which of the following has bond angles slightly less than 109.5°?

1. O₃
2. I₃⁻
3. HOCl



Mlib 03 2087**015 10.0 points**

Which of the following is planar?



ChemPrin3e T03 16**016 10.0 points**What is the shape (molecular geometry) of IF_4^+ ?

1. square planar

2. tetrahedral

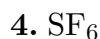
3. trigonal bipyramidal

4. T-shaped

5. seesaw

ChemPrin3e T03 35**017 10.0 points**

Which of the following is polar?



LDE VB Hybridization 001**018 10.0 points**

Which of the following statements concerning hybrid orbitals is/are true?

I) Hybrid orbitals are energetically degenerate.

II) Any element can form sp^3d^2 hybrid orbitals.III) Hybridizing a $2s$ and a $2p$ orbital would produce one single sp hybrid orbital.

1. I, II

2. I, II, III

3. II, III

4. III only

5. I only

6. I, III

7. II only

LDE VB Sigma Pi Bonds 005**019 10.0 points**How many different types of sigma (σ) bonds are found in ethanoic acid, CH_3COOH ? In other words, how many different combinations of atomic orbitals are used when forming the σ bonds in ethanoic acid.

1. 5

2. 4

3. 3

4. 7

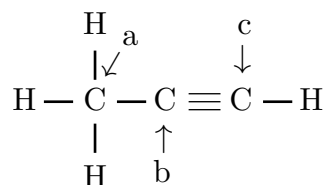
5. none of the above

LDE VB Sigma Pi Bonds 004**020 10.0 points**How many sigma (σ) and pi (π) bonds are in the Lewis structure for $\text{C}(\text{COOH})_4$?1. 16 σ , 4 π 2. 8 σ , 4 π

3. 16 σ , 0 π 4. 12 σ , 0 π 5. 12 σ , 4 π

ChemPrin3e 03 76
021 10.0 points

Carbon has a valence of four in nearly all of its compounds and can form chains and rings of C atoms. Consider the propyne structure.

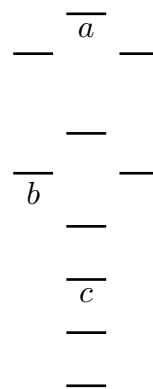


What hybridizations would you expect for the carbon atoms identified by a, b, and c, respectively?

1. sp^3 , sp^2 , sp^3 2. sp^2 , sp , sp 3. sp^3 , sp , sp^3 4. sp^2 , sp^2 , sp^3 5. sp^3 , sp , sp 6. sp^2 , sp , sp^2 7. sp^3 , sp^3 , sp^2

LDE MO Diagram 001
022 10.0 points

Consider the following molecular orbital diagram:



What are the names of the labeled orbitals, a , b , and c , respectively?

1. π_{2p}^* , σ_{2p}^* , σ_{2s} 2. σ_{2p}^* , π_{2p} , σ_{1s}^* 3. σ_{2p}^* , π_{2p} , σ_{2s} 4. σ_{2p}^* , π_{2p} , σ_{2s}^* 5. π_{2p}^* , σ_{2p} , σ_{2s}^*

LDE Bond Order 009
023 10.0 points

All of the species below have the same bond order except for one of them. Which is it?

1. B_2^- 2. H_2^- 3. Ne_2^+ 4. H_2^+ 5. F_2^-

Msci 09 0116
024 10.0 points

An antibonding orbital is formed when

1. a p_x -orbital overlaps a p_z -orbital.

2. a free electron is present in the molecule.

3. an s -orbital overlaps a p -orbital.

4. None of these is correct.
5. the overlap of the corresponding atomic orbitals leads to destructive interference.

LDE Paramagnetism 004**025 10.0 points**

Which of the following species is/are paramagnetic?

- I) Li_2^-
II) O_2
III) H_2^+

1. I only
2. I, II and III
3. II and III
4. III only
5. II only
6. I and III
7. I and II