HW06 - Periodic Trends and Bonding

This is a preview of the published version of the quiz

Started: Sep 25 at 6:02pm

Quiz Instructions

Homework 06 - Periodic Trends and Bonding

Question 1

Let X be a hypothetical element. Which of the following would be the largest?

- \( X^2^- \)
- \( X \)
- \( X^+ \)
- \( X^{2+} \)
- \( X^- \)

Question 2

If the following crystallize in the same type of structure, which has the lowest lattice energy?

- \( \text{BaO} \)
- \( \text{SrO} \)
- \( \text{CaO} \)
- \( \text{SrS} \)
- \( \text{BaS} \)
### Question 3 1 pts

Which pair of elements is most likely to form an ionic compound?

- sodium and aluminum
- nitrogen and sulfur
- oxygen and chlorine
- magnesium and fluorine

### Question 4 1 pts

Covalent compounds are generally made up of elements found in which part of the periodic table?

- upper right
- lower left
- upper left
- left and right

### Question 5 1 pts

Which is the correct order of increasing bond strength?

- double, triple, single
- triple, double, single
- single, double triple
- double, single, triple
### Question 6

Which do you predict to have the strongest C–N bond?

- All are equal.
- NHCH₂
- HCN
- NH₂CH₃

### Question 7

Which of the following contains only covalent bonding and no ionic bonding?

- Ca(NO₃)₂
- CCl₄
- Na₂SO₄
- NaOH

### Question 8

How many valence electrons are in a Kr atom?

- 8
- 0
- 7
- 2
Question 9

The P\(^{2-}\) anion has how many total electrons and how many valence electrons respectively?

- 16, 7
- 17, 8
- 18, 8
- 17, 6
- 16, 8
- 16, 6
- 17, 7

Question 10

What total number of valence electrons should appear in the dot formula for the chlorate ion \(\text{ClO}_3^{-}\)?

- 28
- 24
- 26
- 30

Question 11

An element E has the electronic configuration [Ne] 3s\(^2\) 3p\(^1\). Write the formula of its compound with sulfate.

- \(\text{E}_2\text{SO}_4\)
- \(\text{E}_3\text{SO}_4\)
Question 12

An element E has the electronic configuration 1s^2 2s^2 2p^4. What is the formula of its compound with lithium?

- LiE₂
- Li₄E
- LiE
- Li₂E

Question 13

Which of the following demonstrates the formation of an ionic compound involving the elements Na and S?

- Na^2⁺ + Na^2⁺ + Na^2⁺ + S^{3⁻} + S^{3⁻} \rightarrow \text{Na₃S₂}
- None of these.
- Na⁺ + Na⁺ + Na⁺ + S^{3⁻} \rightarrow \text{Na₃S}
- Na⁺ + S^{⁻} \rightarrow \text{NaS}
- Na^2⁺ + S^{2⁻} \rightarrow \text{NaS}
- Na⁺ + Na⁺ + S^{2⁻} \rightarrow \text{Na₂S}

Question 14
Which of the following is the best representation of the compound calcium sulfide?

- 2Ca\(^+\), S\(^-\)
- 3Ca\(^2+\), 2S\(^3-\)
- Ca\(^2+\), 2S\(^-\)
- Ca\(^+\), S\(^-\)
- Ca\(^2+\), S\(^2-\)

**Question 15**

What is the bond order of the O–O bond in O\(_2\)?

- 2
- 1
- 3
- 0

**Question 16**

How many lone pairs of electrons are on nitrogen in NF\(_3\)?

- three
- one
- zero
- two
### Question 17

How many unshared electrons and bonding electrons exist around the central atom in ozone (O$_3$)?

- [ ] six, two
- [ ] four, four
- [ ] zero, eight
- [ ] two, six

### Question 18

What is the bond order of the C–C bond in acetylene (ethyne, C$_2$H$_2$)?

- [ ] 1
- [ ] 2
- [ ] 3
- [ ] 1.5

### Question 19

How many total bonds and lone pairs exist in the Lewis structure for chlorine fluoride (ClF)?

- [ ] 3, 2
- [ ] 2, 4
- [ ] 1, 4
- [ ] 1, 6
### Question 20

Which of the following compounds contains exactly one unshared pair of valence electrons?

- [ ] C₂H₄
- [ ] PH₃
- [ ] SiH₄
- [ ] H₂S

### Question 21

How many total bonds and lone pairs exist in the Lewis structure for boron trichloride (BCl₃)?

- [ ] 4, 7
- [ ] 3, 9
- [ ] 3, 10
- [ ] 4, 8

### Question 22

The carbonate ion (CO₃²⁻) has how many resonance configurations?

- [ ] 2
- [ ] 3
- [ ] 4
- [ ] The carbonate ion does not exhibit resonance.
Question 23

Resonance is a concept that describes the bonding in molecules...

- where there is more than one choice of location for a double or triple bond as deduced from Lewis dot structures. The true bonding is the average over all possible multiple bond locations.

- by asserting that electrons in a double bond can delocalize (spill over) onto adjacent single bonds to make a bond and a half.

- by asserting that double or triple bonds ‘flip’ or resonate between two locations in the molecule.

Question 24

How many resonance structures can be drawn for N₂O? Disregard any structure with formal charges other than 0, +1, and -1.

- 2
- 3
- 1
- 0

Question 25

How many double bonds are present in the 'best' resonance structure of the phosphate ion?

- 0
- 2
- 3
- 1
Question 26
1 pts

Calculate the formal charge on N in the molecule NH₃.

〇 2
〇 0
〇 1
〇 3

Question 27
1 pts

Which of the three Lewis structures is the most important for the fulminate ion (CNO⁻)? Select all of the correct answers.

A  

\[
\begin{array}{c}
\text{:C=N=O}^- \\
-2 & +1 & 0
\end{array}
\]  
or  

\[
\begin{array}{c}
\text{:C≡N=O}^- \\
-1 & +1 & -1
\end{array}
\]  
or  

\[
\begin{array}{c}
\text{:C≡N=O}^- \\
-3 & +1 & +1
\end{array}
\]  

〇 B
〇 C
〇 A

Question 28
1 pts

Name the compound CaBr₂.

〇 calcium (II) bromide
〇 calcium bromide
〇 calcium bromine
Question 29

Choose the formula for the compound magnesium sulfide.

- MgS
- Mg₂S
- Mg₃S
- MgS₂
- Mg₂S₃

Question 30

Choose the pair of names and formulae that do not match.

- KNO₃: potassium nitrate
- MgSO₄: magnesium sulfate
- SnCl₄: tin (V) chloride
- SiCl₄: silicon tetrachloride
- N₂O₃: dinitrogen trioxide

Question 31

What is the formula of dinitrogen pentoxide?

- NO
- N₂O₅
<table>
<thead>
<tr>
<th>Question 32</th>
<th>1 pts</th>
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</thead>
<tbody>
<tr>
<td>Name the compound CaC$_2$O$_4$.</td>
<td></td>
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<tr>
<td>○ calcium carbonate</td>
<td></td>
</tr>
<tr>
<td>○ calcium carboxide</td>
<td></td>
</tr>
<tr>
<td>○ calcium oxalate</td>
<td></td>
</tr>
<tr>
<td>○ cadmium carboxide</td>
<td></td>
</tr>
<tr>
<td>○ cadmium oxalate</td>
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<table>
<thead>
<tr>
<th>Question 33</th>
<th>1 pts</th>
</tr>
</thead>
<tbody>
<tr>
<td>Give the formula for sodium nitrate.</td>
<td></td>
</tr>
<tr>
<td>○ Na(NO)$_3$</td>
<td></td>
</tr>
<tr>
<td>○ Na(NO$_3$)$_2$</td>
<td></td>
</tr>
<tr>
<td>○ Na$_2$NO$_3$</td>
<td></td>
</tr>
<tr>
<td>○ NaNO$_3$</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Question 34</th>
<th>1 pts</th>
</tr>
</thead>
<tbody>
<tr>
<td>Consider the elements lithium, oxygen, fluorine, and neon. Based on their position in the periodic table, which element would you expect to have the GREATEST tendency to attract a shared pair of electrons?</td>
<td></td>
</tr>
<tr>
<td>○ N$_2$O$_2$</td>
<td></td>
</tr>
<tr>
<td>○ N$_2$O</td>
<td></td>
</tr>
<tr>
<td>○ NO$_3$</td>
<td></td>
</tr>
</tbody>
</table>

https://utexas.instructure.com/courses/1172875/quizzes/1110831/take?preview=1
Question 35  

The electronegativity of nonmetals is relatively _________ as compared to the electronegativity of metals.

- low
- Depends on the elements being compared.
- high
- the same

Question 36  

Which of the following elements would be expected to have the highest electronegativity?

- N
- P
- He
- Al
- C
- Na
### Question 37
1 pts

Generally speaking, in the periodic table, electronegativity (decreases, increases) when moving from left to right and (decreases, increases) when moving from top to bottom of the periodic table.

- [ ] decreases, increases
- [ ] increases, decreases
- [ ] increases, increases
- [ ] decreases, decreases

### Question 38
1 pts

Which of the following bonds will be the most polar?

- [ ] C-N
- [ ] Cl-O
- [ ] C-H
- [ ] S-F

### Question 39
1 pts

What is the difference in electronegativity between H and F?

- [ ] 0.63
- [ ] 0.95
- [ ] 1.78
- [ ] 3.80
**Question 40**

Which bond is most polar?

- P-Cl
- I-Cl
- Cl-Cl
- P-I

**Question 41**

Which substance has nonpolar covalent bonds?

- O₂
- NO₂
- CO
- NaCl

**Question 42**

Which substance has polar covalent bonds?

- NH₃
- Ca₂C
- Cl₂
- O₂
### Question 43

A phosphorous-chlorine bond would be expected to be...

- [ ] polar, with neither end having a partial charge.
- [ ] polar, with the phosphorous end having a partial negative charge.
- [ ] polar, with the chlorine end having a partial negative charge.
- [ ] nonpolar, with the chlorine end having a partial negative charge.
- [ ] nonpolar, with neither end having a partial charge.
- [ ] nonpolar, with the phosphorous end having a partial negative charge.