

Free-Response ANSWER SHEET

(MC score _____ FR score _____ Total raw _____ total % _____)

1. Give a correct systematic name for each formula. [2 each]

<u>Iron(III) hydroxide</u>	$\text{Fe}^{3+} \text{OH}^-$ $\text{Fe}(\text{OH})_3$
<u>sodium oxide</u>	$\text{Na}^+ \text{O}^{2-}$ Na_2O
<u>nitrogen trifluoride</u>	NF_3
<u>potassium hydride</u>	$\text{K}^+ \text{H}^-$ KH
<u>ethene</u>	$\text{CH}_2=\text{CH}_2$

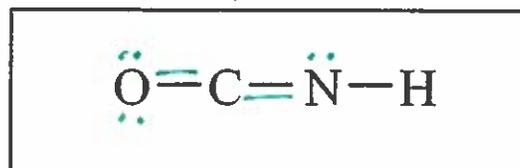
2. Give the correct chemical formula for each substance named. [2 each]

<u>C_3H_4</u>	propyne $\text{H}-\text{C}\equiv\text{C}-\text{CH}_3$
<u>NH_3</u>	ammonia
<u>$\text{Al}_2(\text{SO}_4)_3$</u>	$\text{Al}^{3+} \text{SO}_4^{2-}$ aluminum sulfate
<u>Mg_3P_2</u>	$\text{Mg}^{2+} \text{P}^{3-}$ magnesium phosphide
<u>S_2Cl_6</u>	disulfur hexachloride
<u>Cu_2CO_3</u>	$\text{Cu}^+ \text{CO}_3^{2-}$ copper(I) carbonate

3. Give the symbol of an element that fits each description. In some cases, there may be more than one acceptable answer; choose one. [2 each]

<u>Br</u>	the <u>Period 4 halogen</u> $\text{any Period 4 halogen}$
<u>F</u>	an element that commonly forms a -1 ion any halogen
<u>Zn</u>	a <u>transition metal</u> that forms a <u>constant-charge ion</u> $\text{Zn}^{2+}, \text{Ni}^{2+}$
<u>B</u>	an element whose neutral atoms have 3 valence electrons $\text{any Group 3A or 3B}$
	Li

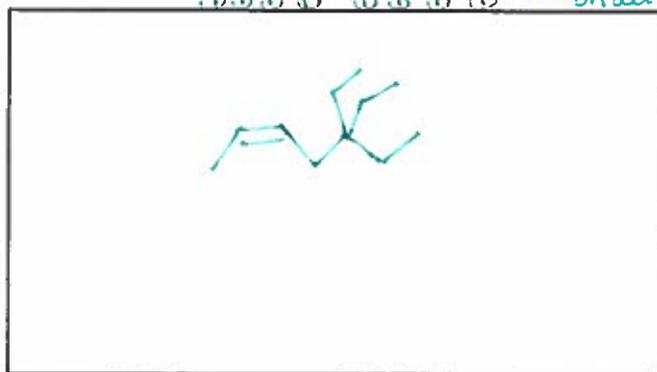
4. [4 pts] Complete the structure: Add lone pair electrons, or turn single bonds into double or triple bonds, as needed so that every atom has its normal electron arrangement. (Do not add any atoms to the molecule.)



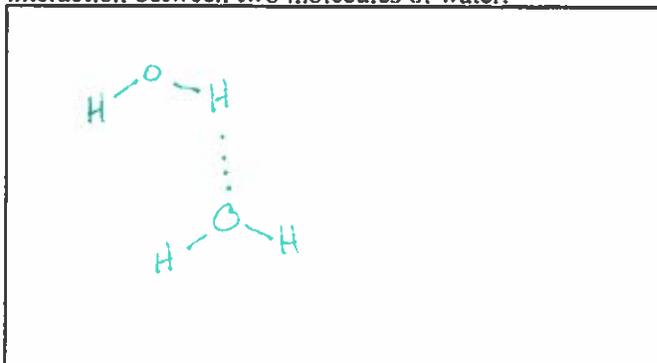
5. Give a reasonable estimate, with appropriate metric unit, for each of the following attributes of a new #2 wooden pencil. [2 each]

- a. the mass of the pencil. $\sim 7\text{g}$ (accepted: 2-50g)
 b. the length. $\sim 18\text{cm}$ (accepted: 8-30 cm)
 c. the volume of the eraser. $\sim 1\text{mL}$ (accepted: 0.05-5 mL)
 d. its temperature, in use in this room. accepted: 18°C - 37°C

6. [9 pts] In the space below, give the structure of 5,5-diethyl-cis-2-heptene. $\text{correct \# bonds on all atoms}$



7. [4 pts] In the space below, sketch the hydrogen bonding interaction between two molecules of water.



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1. Give the symbol of an element that fits each description. In some cases, there may be more than one acceptable answer; choose **one**. [2 each]

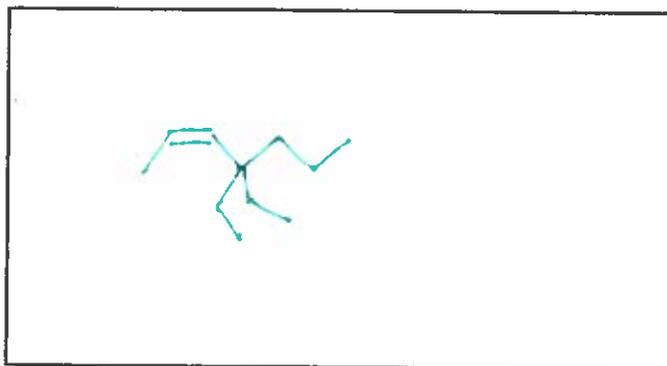
see other page the Period 4 halogen

_____ an element that commonly forms a -1 ion

_____ a transition metal that forms a constant-charge ion

_____ an element whose neutral atoms have 3 valence electrons

2. [9 pts] In the space below, give the structure of 4,4-diethyl-cis-2-heptene.



3. Give a reasonable estimate, with appropriate metric unit, for each of the following attributes of a new #2 wooden pencil. [2 each]

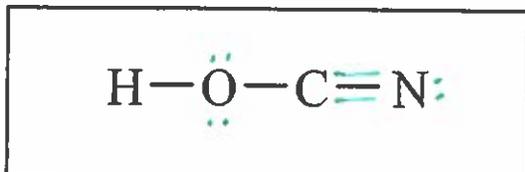
a. the mass of the pencil. see other page

b. the length. _____

c. the volume of the eraser. _____

d. its temperature, in use in this room. _____

4. [4 pts] Complete the structure: Add lone pair electrons, or turn single bonds into double or triple bonds, as needed so that every atom has its normal electron arrangement. (Do not add any atoms to the molecule.)



5. Give the correct chemical formula for each substance named. [2 each]

see other page aluminum sulfate

_____ magnesium phosphide

_____ disulfur hexachloride

_____ propyne

_____ ammonia

_____ copper(I) carbonate

6. Give a correct systematic name for each formula. [2 each]

see other page _____ NF_3

_____ $\text{Fe}(\text{OH})_3$

_____ $\text{CH}_2=\text{CH}_2$

_____ Na_2O

_____ KH

7. [4 pts] In the space below, sketch the hydrogen bonding interaction between two molecules of water.

