

CARNEGIE MELLON UNIVERSITY
09-105 Introduction to Modern Chemistry
Quiz #3
September 29, 2011

First and Last Name KEY

Section _____

(10)
-1 each error

H																	² He
Li	Be											B	C	N	O	F	¹⁰ Ne
Na	Mg											Al	Si	P	S	Cl	¹⁸ Ar
K	Ca	Sc	Ti	V	Cr	Mn	Fe	Co	Ni	Cu	Zn	Ga	Ge	As	Se	Br	³⁶ Kr
Rb	Sr	Y	Zr	Nb	Mo	Tc	Ru	Rh	Pd	Ag	Cd	In	Sn	Sb	Te	I	⁵⁴ Xe
Cs	Ba	La*	Hf	Ta	W	Re	Os	Ir	Pt	Au	Hg	Tl	Pb	Bi	Po	At	⁸⁶ Rn
Fr	Ra	Ac*	Rf	Ha	Sg	Ns	Hs	Mt	Ds	Rg	Cn		114		116		

In each of the **eight** following is a complete, preferred Lewis structure (as defined in class) shown? (Yes or no) The correct number of valence electrons is displayed, but not necessarily the correct location in each case.

species	correct (yes/no)	species	correct (yes/no)
$\text{H} - \overset{\cdot\cdot}{\underset{\cdot\cdot}{\text{P}}} - \text{H}$ H	yes	$:\overset{\cdot\cdot}{\text{O}} = \text{C} = \overset{\cdot\cdot}{\text{N}}:$	no (1)
$\text{Na} - \overset{\cdot\cdot}{\underset{\cdot\cdot}{\text{Cl}}}: $	no (2)	$:\text{C} = \overset{\cdot\cdot}{\text{O}}:$	no (3)
$\begin{array}{c} :\overset{\cdot\cdot}{\text{O}}: \\ \\ :\overset{\cdot\cdot}{\text{Cl}} - \overset{\cdot\cdot}{\underset{\cdot\cdot}{\text{P}}} - \overset{\cdot\cdot}{\text{Cl}}: \\ \\ :\overset{\cdot\cdot}{\text{Cl}}: \end{array}$	no (4)	$\begin{array}{c} :\overset{\cdot\cdot}{\text{F}}: \\ \\ :\overset{\cdot\cdot}{\text{F}} - \overset{\cdot\cdot}{\text{Xe}} - \overset{\cdot\cdot}{\text{F}}: \\ \\ :\overset{\cdot\cdot}{\text{F}}: \end{array}$	yes
$\begin{array}{c} :\overset{\cdot\cdot}{\text{O}}: \\ \\ :\overset{\cdot\cdot}{\text{O}} - \overset{\cdot\cdot}{\text{N}} - \overset{\cdot\cdot}{\text{O}}: \end{array}$	no (5)	$\begin{array}{c} :\overset{\cdot\cdot}{\text{O}}: \\ \\ \text{H} - \overset{\cdot\cdot}{\text{O}} - \overset{\cdot\cdot}{\text{N}} = \overset{\cdot\cdot}{\text{O}}: \end{array}$	no (6)

- (1) $:\overset{\cdot\cdot}{\text{O}} - \text{C} \equiv \overset{\cdot\cdot}{\text{N}}:$ is preferred over the one shown
- (2) $\text{Na}^+ :\overset{\cdot\cdot}{\text{Cl}}:^-$ first example shown in lecture
- (3) $:\overset{\cdot\cdot}{\text{C}} \equiv \overset{\cdot\cdot}{\text{O}}:$ done in lecture
- (4) $\begin{array}{c} :\overset{\cdot\cdot}{\text{O}}: \\ || \\ :\overset{\cdot\cdot}{\text{Cl}} - \overset{\cdot\cdot}{\text{P}} - \overset{\cdot\cdot}{\text{Cl}}: \\ | \\ :\overset{\cdot\cdot}{\text{Cl}}: \end{array}$ done in lecture
- (5) Formal charge required for complete structure (and resonance structures too, for the future)
- (6) Expanded octet on N disallowed (and resonance structures)