## *CHAPTER 4: CHEMICAL BONDING*

1. How many resonance structures can be drawn for phosphate ions, $PO_4^{3-}$?

   A. 2 C. 4

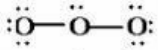
   B. 3 D. none

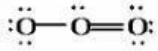
2. The most plausible Lewis structure for a chlorate ion, $ClO_3^-$, should show contain ____ single bond(s), ____ double bond(s), and ____ lone pair(s).

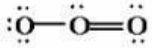
   A. 2, 1, 10 C. 3, 0, 10

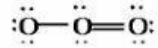
   B. 1, 2, 8 D. 2, 1, 9

3. Which Lewis structure best represents ozone molecule, $O_3$?

   A. 

   B. 

   C. 

   D. 

4. The formal charge on the bromine atom in $BrO_3^-$ drawn with three single bonds is

   A. -2 C. +1

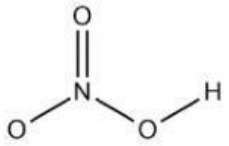
   B. -1 D. +2

5. Nitrous oxide, $N_2O$, is sometimes called "laughing gas". What is the formal charge on the Oxygen atom in the most plausible Lewis structure for nitrous oxide? (The atom connectivity is N-N-O.)

   A. -1 C. +1

   B. 0 D. +2

6. Nitric acid, $HNO_3$ is massively used in the production of explosives and fertilizers. Based on the Lewis structure of nitric acid, state the formal charge for each element in the compound.



| | H | N | $O_a$ | $O_b$ | $O_c$ |
|---|---|---|---|---|---|
| A. | 0 | -1 | 0 | 0 | +1 |
| B. | -1 | 0 | +1 | +1 | -1 |
| C. | 0 | +1 | 0 | 0 | -1 |
| D. | +1 | +1 | -1 | 0 | -1 |

7. For the following species, which one does **NOT** form dative bond?

   A. $H_3O^+$ C. $NH_4^+$

   B. $HO_2^-$ D. $Al_2Cl_6$

8. The electronic configuration of elements X and Y are as follows:

   X: $1s^2\ 2s^2\ 2p^1$

   Y: $1s^2\ 2s^2\ 2p^6\ 3s^2\ 3p^5$

   When X and Y combine, the most plausible formula and bonding are

| | FORMULA | BONDING |
|---|---|---|
| A. | $XY_3$ | covalent |
| B. | $X_2Y$ | covalent |
| C. | $XY_2$ | ionic |
| D. | $X_2Y_3$ | ionic |

9. What element can form an incomplete octet?

   A. Boron C. Bismuth

   B. Bromine D. Barium



LIVEWORKSHEETS