CHEM 110 Chapter 8 Practice Test Questions

1) In the Lewis symbol for a fluorine atom, there are _____ paired and _____ unpaired electrons.
A) 4, 2
B) 4,1
C) 2, 5
D) 6, 1
E) 0, 5

2) How many unpaired electrons are there in the Lewis structures of a N^{3-} ion?
A) 0
B) 1
C) 2
D) 3
E) This cannot be predicted.

3) Which of the following would have to lose two electrons in order to achieve a noble gas electron configuration _____?

O Sr Na Se Br

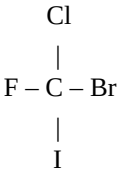
A) O, Se
B) Sr
C) Na
D) Br
E) Sr, O, Se

4) What is the electron configuration for the Co^{2+} ion?
A) $[Ar]4s^1 3d^6$
B) $[Ar]4s^0 3d^7$
C) $[Ar]4s^0 3d^5$
D) $[Ar]4s^2 3d^9$
E) $[Ne]3s^2 3p^{10}$

5) Determining lattice energy from Born-Haber cycle data requires the use of _____.
A) the octet rule
B) Coulomb's law
C) Periodic law
D) Hess's law
E) Avogadro's number

6) A double bond consists of _____ pairs of electrons shared between two atoms.
A) 1
B) 2
C) 3
D) 4
E) 6

7) In the molecule below, which atom has the largest partial negative charge _____?



A) Cl
B) F
C) Br
D) I
E) C

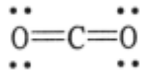
8) Electronegativity _____ from left to right within a period and _____ from top to bottom within a group.
A) decreases, increases
B) increases, increases
C) increases, decreases
D) stays the same, increases
E) increases, stays the same

9) A nonpolar bond will form between two _____ atoms of _____ electronegativity.
A) different, opposite
B) identical, different
C) different, different
D) similar, different
E) identical, equal

10) The ion NO^- has _____ valence electrons.
A) 15
B) 14
C) 16
D) 10
E) 12

11) The Lewis structure of HCN (H bonded to C) shows that _____ has _____ nonbonding electron pairs.
A) C, 1
B) N, 1
C) H, 1
D) N, 2
E) C, 2

12) The formal charge on carbon in the molecule below is _____.



A) 0
B) +1
C) +2
D) +3
E) -1

13) In the Lewis structure of ClF, the formal charge on Cl is _____ and the formal charge on F is _____.
A) -1, -1
B) 0, 0
C) 0, -1
D) +1, -1
E) -1, +1

14) How many equivalent resonance forms can be drawn for CO_3^{2-} - (carbon is the central atom)?
A) 1
B) 2
C) 3
D) 4
E) 0

15) Using the table of average bond energies below, the ΔH for the reaction is _____ kJ.

$$H\text{-}C \equiv C\text{-}H\ (g) + H\text{-}I\ (g) \rightarrow H_2C{=}CHI\ (g)$$

Bond:	C≡C	C=C	H–I	C–I	C–H
D (kJ/mol):	839	614	299	240	413

A) +506
B) -931
C) -506
D) -129
E) +129

16) Using the table of average bond energies below, the $\triangle H$ for the reaction is _____ kJ.

$$C \equiv O\,(g) + 2H_2\,(g) \rightarrow H_3C\text{-}O\text{-}H\,(g)$$

Bond:	C–O	C=O	C≡O	C–H	H–H	O–H
D (kJ/mol):	358	799	1072	413	436	463

A) +276
B) -276
C) +735
D) -735
E) -116

17) Of the ions below, only _____ has a noble gas electron configuration.
A) S^{3-}
B) O^{2+}
C) I^{+}
D) K^{-}
E) Cl^{-}

18) Using the Born-Haber cycle, the ΔH_f° of KBr is equal to _____.
A) $\Delta H_f^\circ[K\,(g)] + \Delta H_f^\circ[Br\,(g)] + I_1(K) + E(Br) + \Delta H_{lattice}$
B) $\Delta H_f^\circ[K\,(g)] - \Delta H_f^\circ[Br\,(g)] - I_1(K) - E(Br) - \Delta H_{lattice}$
C) $\Delta H_f^\circ[K\,(g)] - \Delta H_f^\circ[Br\,(g)] + I_1(K) - E(Br) + \Delta H_{lattice}$
D) $\Delta H_f^\circ[K\,(g)] + \Delta H_f^\circ[Br\,(g)] - I_1 - E(Br) + \Delta H_{lattice}$
E) $\Delta H_f^\circ[K\,(g)] + \Delta H_f^\circ[Br\,(g)] + I_1(K) + E(Br) - \Delta H_{lattice}$

19) Of the atoms below, _____ is the least electronegative.
A) Rb
B) F
C) Si
D) Cl
E) Ca

20) Which of the following has the bonds correctly arranged in order of increasing polarity?
A) Be–F, Mg–F, N–F, O–F
B) O–F, N–F, Be–F, Mg–F
C) O–F, Be–F, Mg–F, N–F
D) N–F, Be–F, Mg–F, O–F
E) Mg–F, Be–F, N–F, O–F

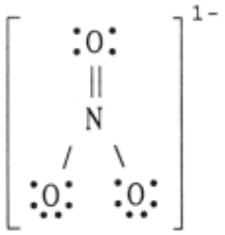
21) The Lewis structure of N_2H_2 shows _____.
A) a nitrogen-nitrogen triple bond
B) a nitrogen-nitrogen single bond
C) each nitrogen has one nonbinding electron pair
D) each nitrogen has two nonbinding electron pairs
E) each hydrogen has one nonbonding electron pair

22) To convert from one resonance structure to another, _____.
A) only atoms can be moved
B) electrons and atoms can both be moved
C) only electrons can be moved
D) neither electrons nor atoms can be moved
E) electrons must be added

23) Bond enthalpy is _____.
A) always positive
B) always negative
C) sometimes positive, sometimes negative
D) always zero
E) unpredictable

24) Given that the average bond energies for C–H and C–Br bonds are 413 and 276 kJ/mol, respectively, the heat of atomization of bromoform ($CHBr_3$) is _____ kJ/mol.
A) 1241
B) 689
C) -689
D) 1378
E) -1378

25) The formal charge on nitrogen in NO_3^- is _____.



A) -1
B) 0
C) +1
D) +2
E) -2