

Name _____

MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

- 1) There are _____ paired and _____ unpaired electrons in the Lewis symbol for a phosphorus atom. 1) _____
A) 4, 3 B) 2, 4 C) 2, 3 D) 4, 2 E) 0, 3
- 2) In the Lewis symbol for a fluorine atom, there are _____ paired and _____ unpaired electrons. 2) _____
A) 4, 1 B) 0, 5 C) 4, 2 D) 2, 5 E) 6, 1
- 3) Based on the octet rule, magnesium most likely forms a _____ ion. 3) _____
A) Mg^{2-} B) Mg^{6-} C) Mg^{-} D) Mg^{6+} E) Mg^{2+}
- 4) Based on the octet rule, phosphorus most likely forms a _____ ion. 4) _____
A) P^{3+} B) P^{5-} C) P^{5+} D) P^{3-} E) P^{+}
- 5) Based on the octet rule, iodine most likely forms an _____ ion. 5) _____
A) I^{4+} B) I^{-} C) I^{+} D) I^{4-} E) I^{2+}
- 6) There are _____ unpaired electrons in the Lewis symbol for an oxygen atom. 6) _____
A) 0 B) 2 C) 3 D) 1 E) 4
- 7) How many unpaired electrons are there in the Lewis structures of a N^{3-} ion? 7) _____
A) 0
B) 1
C) 2
D) 3
E) This cannot be predicted.

8) How many unpaired electrons are there in an O^{2-} ion? 8) _____
A) 0
B) 1
C) 2
D) 3
E) This cannot be predicted.

9) The electron configuration of the phosphide ion (P^{3-}) is _____. 9) _____
A) $[Ne]3p^2$
B) $[Ne]3s^2$
C) $[Ne]3s^23p^6$
D) $[Ne]3s^23p^1$
E) $[Ne]3s^23p^3$

10) The halogens, alkali metals, and alkaline earth metals have _____ valence electrons, respectively. 10) _____
A) 7, 1, and 2 B) 2, 7, and 4 C) 1, 5, and 7 D) 7, 4, and 6 E) 8, 2, and 3

11) The only noble gas without eight valence electrons is _____. 11) _____
A) Ar
B) Kr
C) Ne
D) He
E) All noble gases have eight valence electrons.

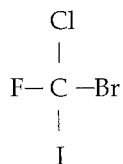
12) Which of the following would have to lose two electrons in order to achieve a noble gas electron configuration _____? 12) _____
O Sr Na Se Br
A) Sr B) Sr, O, Se C) Br D) Na E) O, Se

13) Which of the following would have to gain two electrons in order to achieve a noble gas electron configuration _____? 13) _____
O Sr Na Se Br
A) O, Se B) Br C) Sr, O, Se D) Sr E) Na

- 14) For a given arrangement of ions, the lattice energy increases as ionic radius _____ and as ionic charge _____. 14) _____
- A) increases, decreases
 B) decreases, decreases
 C) decreases, increases
 D) increases, increases
 E) This cannot be predicted.
- 15) The electron configuration of the S^{2-} ion is _____. 15) _____
- A) $[Ar]3s^23p^6$
 B) $[Kr]3s^22p^{-6}$
 C) $[Ne]3s^23p^2$
 D) $[Ne]3s^23p^6$
 E) $[Ar]3s^23p^2$
- 16) The principal quantum number of the electrons that are lost when tungsten forms a cation is _____. 16) _____
- A) 6 B) 5 C) 4 D) 3 E) 2
- 17) Which one of the following species has the electron configuration $[Ar]3d^4$? 17) _____
- A) Cr^{2+} B) V^{3+} C) Fe^{3+} D) Mn^{2+} E) K^+
- 18) What is the electron configuration for the Co^{2+} ion? 18) _____
- A) $[Ne]3s^23p^{10}$
 B) $[Ar]4s^03d^5$
 C) $[Ar]4s^03d^7$
 D) $[Ar]4s^23d^9$
 E) $[Ar]4s^13d^6$
- 19) The formula of palladium(IV) sulfide is _____. 19) _____
- A) PdS_4 B) Pd_2S_4 C) Pd_4S D) Pd_2S_2 E) PdS_2
- 20) What is the electron configuration for the Fe^{2+} ion? 20) _____
- A) $[Ar]4s^03d^8$
 B) $[Ar]4s^63d^2$
 C) $[Ar]4s^23d^4$
 D) $[Ar]4s^03d^6$
 E) $[Ar]4s^23d^8$

- 21) Elements from opposite sides of the periodic table tend to form _____. 21) _____
- A) homonuclear diatomic compounds
 - B) covalent compounds that are gaseous at room temperature
 - C) covalent compounds
 - D) compounds that are gaseous at room temperature
 - E) ionic compounds
- 22) Determining lattice energy from Born-Haber cycle data requires the use of _____. 22) _____
- A) Periodic law
 - B) Hess's law
 - C) Avogadro's number
 - D) Coulomb's law
 - E) the octet rule
- 23) How many single covalent bonds must a silicon atom form to have a complete octet in its valence shell? 23) _____
- A) 3 B) 0 C) 2 D) 4 E) 1
- 24) A _____ covalent bond between the same two atoms is the longest. 24) _____
- A) double
 - B) triple
 - C) single
 - D) They are all the same length.
 - E) strong
- 25) How many hydrogen atoms must bond to silicon to give it an octet of valence electrons? 25) _____
- A) 1 B) 2 C) 3 D) 4 E) 5
- 26) A double bond consists of _____ pairs of electrons shared between two atoms. 26) _____
- A) 1 B) 2 C) 3 D) 4 E) 6
- 27) What is the maximum number of double bonds that a hydrogen atom can form? 27) _____
- A) 0 B) 1 C) 2 D) 3 E) 4
- 28) What is the maximum number of double bonds that a carbon atom can form? 28) _____
- A) 4 B) 3 C) 2 D) 1 E) 0

29) In the molecule below, which atom has the largest partial negative charge _____? 29) _____



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

30) The ability of an atom in a molecule to attract electrons is best quantified by the _____. 30) _____

- A) electron charge-to-mass ratio
- B) paramagnetism
- C) first ionization potential
- D) diamagnetism
- E) electronegativity

31) Given the electronegativities below, which covalent single bond is most polar? 31) _____

Element:	H	C	N	O
Electronegativity:	2.1	2.5	3.0	3.5

- A) O-H B) C-H C) O-N D) N-H E) O-C

32) Electronegativity _____ from left to right within a period and _____ from top to bottom within a group. 32) _____

- A) stays the same, increases
- B) decreases, increases
- C) increases, stays the same
- D) increases, increases
- E) increases, decreases

33) A nonpolar bond will form between two _____ atoms of _____ electronegativity. 33) _____

- A) similar, different
- B) identical, different
- C) identical, equal
- D) different, opposite
- E) different, different

34) The ion ICl_4^- has _____ valence electrons. 34) _____

- A) 36 B) 8 C) 35 D) 34 E) 28

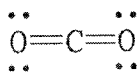
35) The ion NO^- has _____ valence electrons. 35) _____
 A) 14 B) 10 C) 12 D) 15 E) 16

36) The Lewis structure of AsH_3 shows _____ nonbonding electron pair(s) on As. 36) _____
 A) 0
 B) 1
 C) 2
 D) 3
 E) This cannot be determined from the data given.

37) The Lewis structure of PF_3 shows that the central phosphorus atom has _____ nonbonding and _____ bonding electron pairs. 37) _____
 A) 2, 2 B) 1, 3 C) 1, 2 D) 3, 3 E) 3, 1

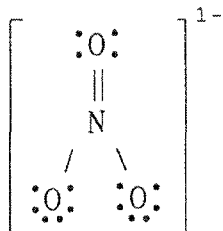
38) The Lewis structure of HCN (H bonded to C) shows that _____ has _____ nonbonding electron pairs. 38) _____
 A) H, 1 B) C, 2 C) N, 1 D) N, 2 E) C, 1

39) The formal charge on carbon in the molecule below is _____. 39) _____



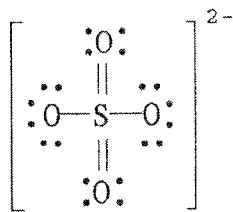
A) +1 B) 0 C) +2 D) +3 E) -1

40) The formal charge on nitrogen in NO_3^- is _____. 40) _____



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

41) The formal charge on sulfur in SO_4^{2-} is _____, where the Lewis structure of the ion is: 41) _____

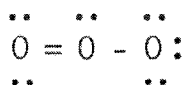


- A) -2 B) +2 C) 0 D) -4 E) +4

42) In the Lewis structure of ClF , the formal charge on Cl is _____ and the formal charge on F is _____ 42) _____

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

43) In the resonance form of ozone shown below, the formal charge on the central oxygen atom is _____ 43) _____



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

44) How many equivalent resonance forms can be drawn for SO_2 without expanding octet on the sulfur atom (sulfur is the central atom)? 44) _____

- A) 1 B) 0 C) 3 D) 4 E) 2

45) How many equivalent resonance forms can be drawn for CO_3^{2-} (carbon is the central atom)? 45) _____

- A) 2 B) 1 C) 3 D) 4 E) 0

46) How many equivalent resonance structures can be drawn for the molecule of SO_3 without having to violate the octet rule on the sulfur atom? 46) _____

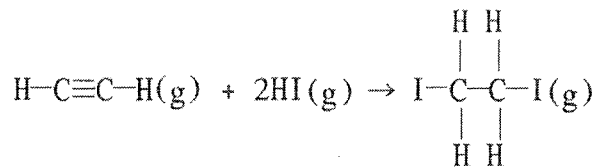
- A) 3 B) 2 C) 1 D) 4 E) 5

47) How many different types of resonance structures can be drawn for the ion SO_3^{2-} where all atoms satisfy the octet rule? 47) _____

- A) 5 B) 1 C) 4 D) 3 E) 2

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

48) _____

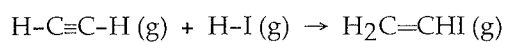


Bond:	$\text{C}\equiv\text{C}$	$\text{C}-\text{C}$	$\text{H}-\text{I}$	$\text{C}-\text{I}$	$\text{C}-\text{H}$
D (kJ/mol):	839	348	299	240	413

- A) -217 B) -160 C) +160 D) +63 E) -63

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

49) _____

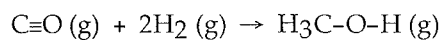


Bond:	$\text{C}\equiv\text{C}$	$\text{C}=\text{C}$	$\text{H}-\text{I}$	$\text{C}-\text{I}$	$\text{C}-\text{H}$
D (kJ/mol):	839	614	299	240	413

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

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

50) _____

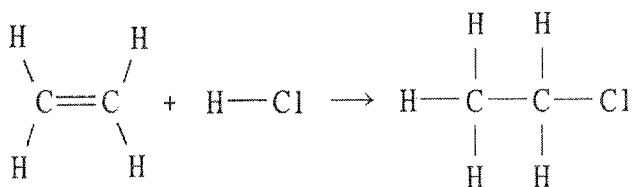


Bond:	$\text{C}-\text{O}$	$\text{C}=\text{O}$	$\text{C}\equiv\text{O}$	$\text{C}-\text{H}$	$\text{H}-\text{H}$	$\text{O}-\text{H}$
D (kJ/mol):	358	799	1072	413	436	463

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

51) Using the table of bond dissociation energies, the ΔH for the following gas-phase reaction is _____ kJ.

51) _____



Bond	D (kJ/mol)
C-C	348
C=C	614
C-H	413
H-Cl	431
C-Cl	328

A) -38

B) -44

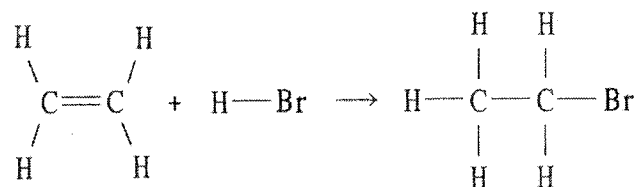
C) 2134

D) 38

E) 304

52) Using the table of bond dissociation energies, the ΔH for the following gas-phase reaction is _____ kJ.

52) _____



Bond	D (kJ/mol)
C-C	348
C=C	614
C-H	413
H-Br	366
C-Br	276

A) -291

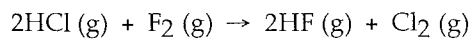
B) 291

C) -57

D) 2017

E) -356

53) Using the table of bond dissociation energies, the ΔH for the following reaction is _____ kJ. 53) _____



Bond	D (kJ/mol)
H-Cl	431
F-F	155
H-F	567
Cl-Cl	242

A) 359

B) -359

C) 223

D) 208

E) -223

Answer Key

Testname: CHAPTER 8

- 1) C
- 2) E
- 3) E
- 4) D
- 5) B
- 6) B
- 7) A
- 8) A
- 9) C
- 10) A
- 11) D
- 12) A
- 13) A
- 14) C
- 15) D
- 16) A
- 17) A
- 18) C
- 19) E
- 20) D
- 21) E
- 22) B
- 23) D
- 24) C
- 25) D
- 26) B
- 27) A
- 28) C
- 29) B
- 30) E
- 31) A
- 32) E
- 33) C
- 34) A
- 35) C
- 36) B
- 37) B
- 38) C
- 39) B
- 40) E
- 41) C
- 42) C
- 43) E
- 44) E
- 45) C
- 46) A
- 47) B
- 48) A
- 49) A
- 50) E

Answer Key

Testname: CHAPTER 8

51) B

52) C

53) B