Question 1

Arrange the following bonds in order of increasing polarity:

C-O, C-C, C-N, C-F

A. C-O < C-C < C-N < C-F

B. C-N < C-O < C-F < C-C

C. C-F < C-O < C-N < C-C

D. C-C < C-N < C-O < C-F

E. C-C < C-O < C-N < C-F

Question 2

Which of the following molecules has the most ionic bond character?

A. NCl_3 B. F_2 C. HF D. ClF E. HCl

Question 3

Which of the following molecules has the most covalent bond character?

A. NH_3 B. IBr C. IF D. NaF E. PbO

Question 4

The correctly drawn Lewis formula for SiH_4 will have _____.

A. 4 single bonds and 1 pair of nonbonding electrons on the Si atom

B. 4 double bonds to the Si atom

C. 2 single and 2 double bonds on the Si atom

D. 2 single bonds to Si and 2 single bonds to terminal H atoms

E. 4 single bonds to Si

Question 5

The total number of valence electrons that must be shown in the dot formula for the $C_4H_5Cl_2FO$ molecule is ____.

A. 42 B. 44 C. 46 D. 48 E. 50

Question 6

Arrange the following elements in order of increasing electronegativities:

P, N, Sb, Bi

A. Bi, Sb, P, N

B. N, P, Sb, Bi

C. Sb, P, Bi, N

D. P, N, Bi, Sb

E. Bi, N, P, Sb

Question 7

Which of the following compounds is likely to have covalent bonds?

A. LiBr B. CsF C. $BaCl_2$ D. Cr_2O_3 E. NO_2

Question 8

Arrange the following bonds in order of increasing polarity:

O-H, C-H, F-H, H-H

A. O-H < C-H < F-H < H-H

B. C-H < O-H < F-H < H-H

C. H-H < C-H < O-H < F-H

D. C-H < H-H < O-H < F-H

E. H-H < C-H < F-H < O-H

Question 9

Which molecule has the least polar covalent bond?

A. HBr B. HF C. HI D. H_2 E. HCl

Question 10

Identify the main-group element X that could form the compound XF3 with 3 bonding pairs and 1 nonbonding pairs on atom X.

A. C B. O C. N D. F E. P

Question 11

Which of these molecules or ions has less than an octet on the central atom (other than H)?

A. BCl_3 B. F_2 C. PH_3 D. NO_3^- E. SF_2

Question 12

How many single bonds are typically formed by the element N?

A. 1 B. 2 C. 3 D. 4 E. the number of bonds varies

Question 13

Which of these molecules or ions has a violation of the octet rule (other than H)?

A. C_2H_2 B. NH_4^+ C. SO_2 D. BeF_2 E. I_2

Question 14

Which of the following molecules has three lone pairs of electrons on the central atom?

A. XeF_4 B. SF_4 C. SO_3 D. XeF_2 E. NCl_3

Question 15

Which molecule exhibits resonance?

A. BeI_2 B. O_3 C. H_2S D. PF_3 E. CO_2

Question 16

The correctly drawn Lewis formula for HCN will have _____.

A. 2 single bonds and 5 pairs of nonbonding electrons

B. 1 single bond, 1 double bond, and 3 pairs of nonbonding electrons

C. 2 double bonds and 2 pairs of nonbonding electrons

D. 1 single bond, 1 triple bond, and 1 pair of nonbonding electrons

E. 2 double bonds and 1 pair of nonbonding electrons

Question 17

Arrange the following elements in order of increasing electronegativities:

C, Ge, Sn, Pb

A. Pb, C, Sn, Ge

B. C, Pb, Ge, Sn

C. Sn, Pb, Ge, C

D. Pb, Sn, Ge, C

E. Ge, Pb, C, Sn

Question 18

Identify the main-group element X that could form the compound XF_4 with four bonding pairs and 0 nonbonding pairs on atom X.

A. C B. O C. N D. F E. P

Question 19

Which molecule below has only one unshared pair of electrons in the valence shell of the central atom?

A. H_2S B. HF C. PH_3 D. BCl_3 E. $BeCl_2$

Question 20

Identify the main-group element X that could form the compound XCl_2 with 2 bonding pairs and 2 nonbonding pairs on atom X.

A. C B. O C. N D. F E. P

Question 21

The correctly drawn Lewis formula for C_2H_4 will have _____.

A. 4 single bonds

B. 5 single bonds

C. 4 single bonds and 1 double bond

D. 4 single bonds and 1 triple bond

E. 5 double bonds

Question 22

Which of the following compounds is likely to have covalent bonds?

A. NaCl B. LiF C. CO D. $CaBr_2$ E. MgO

Question 23

Arrange the following bonds in order of increasing polarity:

Cl-S, Cl-P, Cl-Si, Cl-Cl

A. Cl-S < Cl-P < Cl-Si < Cl-Cl

B. Cl-S < Cl-Si < Cl-P < Cl-Cl

C. Cl-Si < Cl-S < Cl-Cl < Cl-P

D. Cl-Cl < Cl-S < Cl-P < Cl-Si

E. Cl-Cl < Cl-P < Cl-Si < Cl-S

Question 24

Arrange the following bonds in order of increasing polarity:

F-F, F-C, F-O, F-N

A. F-F < F-C < F-O < F-N

B. F-F < F-O < F-N < F-C

C. F-O < F-N < F-F < F-C

D. F-N < F-O < F-F < F-C

E. F-N < F-C < F-O < F-F

Question 25

Which of these molecules or ions has less than an octet on the central atom (other than H)?

A. CO B. H_2O C. PCl_5 D. Br_2 E. NH_3

Question 26

Which of the following compounds is likely to have covalent bonds?

A. MgS B. KF C. SO2 D. SrCl2 E. RbF

Question 27

How many valence electrons does a bromine atom have?

A. 7 B. 6 C. 3 D. 5 E. 4

Question 28

Which molecule has the most polar covalent bond?

A. IBr B. HCl C. N_2 D. H_2 E. PH_3

Question 29

Arrange the following elements in order of increasing electronegativities:

S, Na, Cl, Mg

A. S, Na, Mg, Cl

B. Na, Mg, S, Cl

C. Cl, S, Mg, Na

D. Mg, S, Na, Cl

E. Cl, Na, Mg, S

Question 30

Which molecule contains the least polar bonds?

(Electronegativities: H = 2.1, C = 2.5, F = 4.0, Cl = 3.0, Br = 2.8, I = 2.5)

A. CF_4 B. CCl_4 C. CBr_4 D. Cl_2 E. CH_4