Chem 15

Homework Ex (Chem. Bonds)
(Answer Key)

1. (a) $M \longrightarrow \underline{M^+} + e^-$

   (b) $X + e^- \longrightarrow \underline{X^-}$

2. (a) Na^+, $[:\ddot{F}:]^-$ (b) Be^{2+}, $[:\ddot{O}:]^{2-}$

   (c) Al^{3+}, $3[:\ddot{Cl}:]^-$ (d) $3Ca^{2+}$, $2[:\ddot{N}:]^{3-}$

3. (c) Mg^{2+} and Ar are not isoelectronic (same electron config.)

4. (a) K_2S (b) Li_2S (c) Al_2S_3 (d) BeS

5. (a) $Mg_3(PO_4)_2$ (b) $MgCO_3$ (c) $Mg(ClO_3)_2$ (d) $Mg(C_2H_3O_2)_2$

6. Electronegativity is an ability of atom to attract an electron pair(s) in a chemical bond.

   H C N O F

   $\longrightarrow$ electronegativity increases

7. (a) Be B C N $\longrightarrow$ most electroneg.

   (b) Te Se S O $\longrightarrow$

   (c) Na, Mg, Al, B $\longrightarrow$

   (d) K, Al, N, F $\longrightarrow$

8. (a) ionic (b) ionic (c) nonpolar covalent
(d) polar covalent

9. $Cl-Cl$, $Br-Cl$, $I-Cl$, $F-Cl$ → most polar bond

(a) non-polar bond : $Cl-Cl$, $Br-Cl$

(b) polar covalent : $I-Cl$, $F-Cl$

10. K^+, $[:\ddot{Cl}:]^-$ Ionic Bond : It is formed due to the electron transfer from metal to non-metal causing opposite charges which attract due to the electrostatic attraction.

$:\ddot{Cl}:\ddot{Cl}:$ Covalent Bond : It is formed due to the electron pair sharing between two chlorine non-metal atoms.

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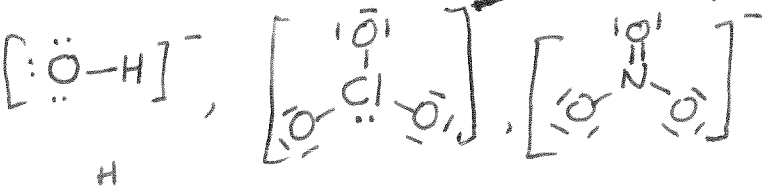
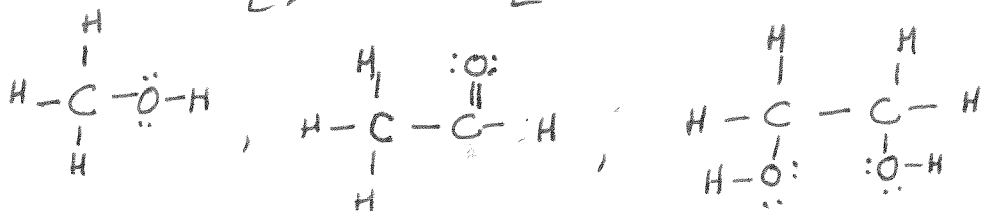
		Bond Polarity	Molec. Polarity
(a)	X – A — X	yes	no
(b)	A – X — X	yes	yes
(c)		yes	yes
(d)		no	no

12.

Element	electron Dot Str.	common Covalency
N		3
O, S		2
F, Cl, Br, I		1
H		1

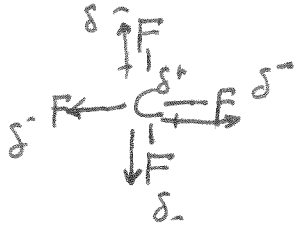
13. CCl_4 , NCl_3 , HBr, SiH_4 , PCl_3

14. (a) 

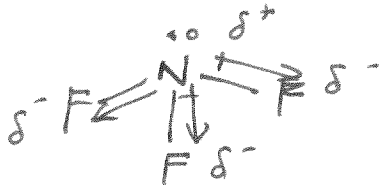
(b) 

15.

		e⁻ geom.	mol. geom
(a)	BH_3	Trig. planar	Trig. planar
(b)	NF_3	Tetrahedral	Trig. pyramid
(c)	CF_4	Tetrahedral	Tetrahedral
(d)	C_2H_4	Trig. planar	Trig. planar
(e)	C_2H_2	Linear	Linear

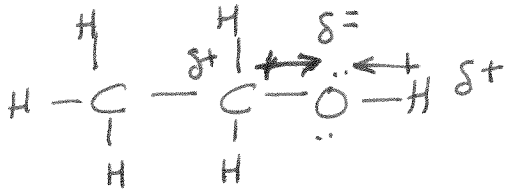
16. 

nonpolar due to the even symmetric distribution of bond polarities

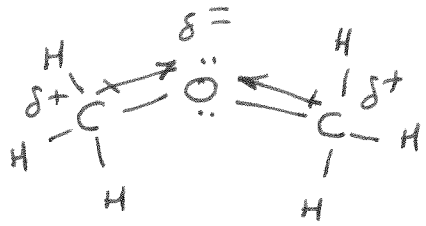


poler due to non symmetric distribution of bond polarities and the lone pair on N atom.

17. (a)



alcohol



ether

(b) alcohol is more polar than ether.

(c) alcohol is a polar compound due to a stronger $\overset{\delta^-}{\leftarrow}\!\!-O-H^{\delta+}$ bond polarity than $C \overset{\delta+}{\rightarrow} O \overset{\delta-}{\leftarrow} C$ bond polarity in ether.