**Review # 3 (Module 4-Compounds )**

**Solve all the Questions and then check Answers from Ans key provided at the end. Feel as if you are taking the Real Exam.**

**Ques 1.** Fill in the blanks with correct option:

a) An ……. results from a transfer of one or more electrons from one atom or molecule to another. (**Ionic bond / Covalent bond)**

b) A …….is a chemical bond that results from the sharing of a pair of electrons between two atoms. (**Ionic bond / Covalent bond)**

c) How many valence electrons does the representative element with the electron configuration $1s^2\ 2s^2\ 2p^6\ 3s^2\ 3p^4$ possess?..... **(4 / 6)**

d) Elements in groups IA and VIIA of the periodic table would, respectively, be expected to form ions with charges of: ……..**(-1 and+1 / +1 and -1)**

e) The Roman numeral (II) in the name Iron (II) chloride indicates that……. (**charge on Fe / charge on F)**

f) Copper is an example of ……metal. **(Fixed charge / Variable charge)**

g) Calcium is an example of ……metal. **(Fixed charge / Variable charge)**

h) $NH_4^+$ and $PO_4^{3-}$ are examples of…… **(polyatomic anion / mono atomic anion)**

**Ques 2.** Which of the following is ***not*** **a** binary compound? Circle it:

a) $Ca_3P_2$
b) $H_2CO_3$
c) $FeCl_3$
d) $PCl_5$

**Ques 3.** What is the correct formula for Manganese (III) cyanide? Circle the correct option:

a) Mn(CN)3

Hint: Lecture video on naming of the compounds

a) $Ba_3P_2$

b) MnSCN

c) Mn(SCN)3

d) MnCN

**Ques 4.** Indicate which one is cation and which one is anion in the following

a) Magnesium [ ]
b) Oxygen [ ]
c) Chlorine [ ]
d) Zinc [ ]
e) Cadmium [ ]

**Ques 5.** The "octet rule" relates to the number eight because……. Circle the correct option:

a) only atoms with 8 valence electrons undergo chemical reaction

b) all atoms have 8 valence electrons

c) electron arrangements involving 8 valence electrons are extremely stable

d) all orbitals can hold 8 electrons

**Ques 6.** How many valence electrons does a Sulphur (S) atom have?

a) 2

b) 4

c) 14

d) 6

**Ques 7.** Which of the following statements about the noble gases is *False*? Circle it:

a) All of them exist in nature as individual atoms rather than molecular form.

b) All of them have very stable electron arrangements.

c) They are the most reactive of all gases.

d) All of them have 8 valence electrons.

**Ques 8.** Which of the following statements about the alkali metals is *False*? Circle it:

a) All of them occur in Group 1.

b) All of them have very stable electron arrangements.

c) All of them have 1 valence electrons.

d) They are the most reactive of all metals.

**Ques 9.** First Identify the Fixed charge metals or the variable charge metals present in given Ionic Compounds and then name the compound as per nomenclature rules.

| | Ionic Compounds | Metal is Fixed Charge Or Variable charge metal? | Nomenclature or Naming Ionic compounds |
|---|---|---|---|
| a | $AlCl_3$ | | |
| b | CuO | | |
| c | $K_2S$ | | |
| d | $Mn_2S_3$ | | |

**Ques 10 (I).** Circle the correct name of Polyatomic Ionic compounds:

**a)** $MgSO_4$ (Magnesium sulfate / Magnesium sulfite)

**b)** $NH_4Cl$ (Nitrogen hydrogen chloride / Ammonium chloride)

**Ques 10 (II).** Name the molecular binary compound:

a) $PCl_5$

b) $Cl_2O_7$

**Ques 11(I).** Show the Lewis Structures for Ionic Compounds formed between metal and non-metal and check if given formula is correct:

Hint: Lecture video on Ionic and covalent compounds

b) $Ba_3P_2$

c) $Al_2O_3$

**a)**

**b)**

**Ques 11 (II).** Show Lewis Structure for Covalent compounds and calculate total valence electrons.

Hint: Lecture video on Ionic and covalent compounds

a) $N_2H_4$

b) $C_3H_8$

**a)**

**b)**

**Ques 12.** Fill in the Table: Hint: Molecular Geometry topic from Lecture video on Ionic and covalent compounds

| **Molecules** | **Identify the Central atom in the given molecule** | **Draw the Lewis dot structure for the given molecules** | **Number of atoms bonded to Central atom** | **No. of Non-bonded Electron Pairs to Central atom** | **No. Of VSEP R Group** | **Name Shapes** |
|---|---|---|---|---|---|---|
| $SiCl_4$ | | | | | | |
| $CH_2O$ | | | | | | |
| $NH_3$ | | | | | | |
| $Cl_2O$ | | | | | | |
| $CS_2$ | | | | | | |

**Ques 13.** Write **True or False**:

a) Ionic compounds generally contain metal and nonmetal elements.

b) Formulas of ionic compounds are written with the anion first, then the cation.

c) Cations and anions combine in the simplest ratio which achieves electrical neutrality.

d) The number of electrons lost by the cation(s) must equal the number gained by the anion(s) in an ionic compound.

e) Ionic compounds contain a metal ion or a positive polyatomic ion, and covalent compounds do not contain metal ions.

f) Double bonding can occur with Group VII A elements.

**Ques 14.** With the help of Electronegativity Chart provided find out the electronegativity difference and classify the bond formed between each of the following are **non-polar covalent, polar covalent or ionic:** Hint: Electronegativity topic from Lecture video on Ionic and covalent compounds

a) Oxygen and Hydrogen

b) Oxygen and Lithium

c) Oxygen and Sulphur

d) Oxygen and oxygen

**Ques 15.** Identify Molecular compound as Polar or Non-Polar?

HINT: Draw the Lewis dot structure and see if the compound is Symmetrical (mirror image- are always non-polar) or Asymmetrical (not mirror image are polar) Lecture video on Ionic and covalent compounds

a) $CF_4$
b) $CH_3F$
c) $NH_3$
d) $C_2H_2$
e) $H_2O$

**Ques 16.** The prefix “hepta” represent

a) 4
b) 8
c) 7
d) 8

**Ques. 17.** Roman number in ionic compounds nomenclature represents?

a) Charge on fixed metal
b) Charge on nonmetal
c) Charge on metalloid
d) Charge on variable metal

**Ques. 18.** Name each of the following acids.

a) HF

b) $H_2SO_4$

c) $HNO_3$

d) HI

e) $H_2SO_3$

**Ques. 19.** Classify the following as Ionic or covalent compounds

a) BaO
b) $CuCl_2$
c) $PCl_5$
d) HCl
e) $Fe_2O_3$
f) $H_3PO_4$

**Ques. 20.** How many valence electrons does Phosphorus have?

a) 4
b) 5
c) 6
d) 7

**Ans Key for Review # 3**

1. a) Ionic bond b) Covalent bond c) 6 (six) d) +1 & -1 e) Iron has +2 charge

f) Variable charged metal g) fixed charge metal h) Poly atomic ions

2. b

3. a

4. a) cation b) anion c) anion d) cation e) cation

5. c

6. d

7. c

8 b

9 a) Aluminum chloride, Al is fixed charge metal b)Copper (II) oxide, Cu is Variable charge metal c) Potassium sulfide, K is Fixed charge metal d) Manganese (III) sulfide, Mn is variable charge metal

10 (I). a) Magnesium sulfate b) Ammonium chloride

10 (II). a) Phosphorous pentachloride b) Dichlorine heptoxide

12. a) $SiCl_4$ -tetrahedral with 4 VESPR group (all bonding) and Si as central atom

b) $CH_2O$-trigonal planar with 3 VESPR group (all bonding) and C as central atom

c) $NH_3$ -trigonal pyramidal with 4 VESPR group (3 B and 1 NB) and N as central atom

d) $Cl_2O$-bent or angular with 4 VESPR group (2 B and 2 NB) and O as central atom

e) $CS_2$ – Linear with 2 VSEPR group (both bonding atoms) and C as central atom

13. a) True b) False c) True d) True e) True f) False

14. a) Polar covalent b) Ionic c) Polar covalent d) Non-polar covalent

15. a) Non-polar compound (Electronegativity difference is less than 0.4) b) Ionic (Electronegativity difference is greater than 2) c) Polar compound (Electronegativity difference is between 0.4- 1.5) d) Non-polar compound (Electronegativity difference is less than 0.4) e) Polar compound (Electronegativity difference is between 0.4- 1.5)

16. c)

17. d)

18. a) Hydrofluoric acid b) Sulfuric acid c) Nitric acid d) Hydroiodic acid

e) Sulfurous acid

19. a) Ionic b) Ionic c) covalent d) covalent e) Ionic f) covalent

20. b)