

MH1_PRACTICE PROBLEMS FOR MIDTERM
SUMMER 2020

(THIS IS A GUIDELINE NOT THE ACTUAL QUESTIONS, PLEASE CONSULT YOUR BOOKS & LECTURE SLIDES FOR BETTER PREPARATION)

1. Write Name/Formula of the following compounds:

Sodium sulfate, ammonium phosphate, magnesium sulfite, aluminum chlorate, barium nitrate, ferric chloride, aluminum hydroxide, cobalt(III) chromate, calcium bicarbonate, nickel(II) phosphate, potassium dichromate, mercury(II) phosphate, MgBr_2 , Sn_3N_2 , KMnO_4 , $\text{Hg}(\text{NO}_3)_2$, NH_4HCO_3 , NH_4NO_3 , Cu_2S , $\text{Fe}(\text{SCN})_3$, KH_2PO_4 , SrF_2 , Pb_3N_4 , Cr_2O_3 , KHSO_3 , CO_2 , etc.

2. Complete the Lewis structures:

CO_2H , CH_4N , CS_2 , CH_3OH , C_2H_2 , C_2H_4 , NH_3O , $\text{C}_2\text{H}_4\text{O}_2$, $\text{C}_2\text{H}_5\text{O}$, CH_2O , etc.

3. Categorize each molecule below by writing P (polar) or N (nonpolar) in the boxes provided.

ClF_5 , ClF_3 , F_2O , SCl_2 , CF_4 , PBr_3 , SF_6 , XeF_4 , PCl_5 , XeF_2 , CH_4 , C_2H_4 , C_2H_2 , BeCl_2 , HgCl_2 , SF_4 , NH_3 , H_2O , HF , CO , CO_2 , CCl_4 , CH_3OH , CH_3CH_3 , $\text{CH}_3\text{CH}_2\text{OH}$, etc.

4. How many valence electrons are needed in the Lewis diagram of the inorganic compound whose skeletal structure is shown below?

ClF_5 , ClF_3 , F_2O , SCl_2 , CF_4 , PBr_3 , SF_4 , XeF_4 , PCl_5 , XeF_2 , etc.

5. Predict the geometries and bond angle of these species using hybridization and VSEPR method

ClF_5 , ClF_3 , F_2O , SCl_2 , CF_4 , PBr_3 , SF_6 , XeF_4 , PCl_5 , XeF_2 , CH_4 , C_2H_4 , C_2H_2 , BeCl_2 , HgCl_2 , SF_4 , NH_3 , H_2O , etc.

6. Draw resonance form for CO_3^{2-} , N_3^- , O_3 , N_2O , SO_4^{2-} , C_6H_6 , NO_3^- , etc.

7. Draw pictures of N_2 , H_2O , CO_2 and other small organic molecules showing all bonding orbitals and lone pairs. Sigma bond by head on overlapping of orbitals (s and/or p) and pi bonds by side on overlapping of p orbital.

8. All definitions in chemical bonding.