Chemistry 114
First Hour Exam

Name:_____

1. (38 points) Write the (A)Lewis structures, (B) give the electron arrangement,(C) molecular structure, (D) the bond angles, (E) the hybridization of the S atom, and (F) predict the polarity of the following compounds. (Total of 6 points/molecule) Also indicate any alternate resonance structures.

SF_2

SF_4

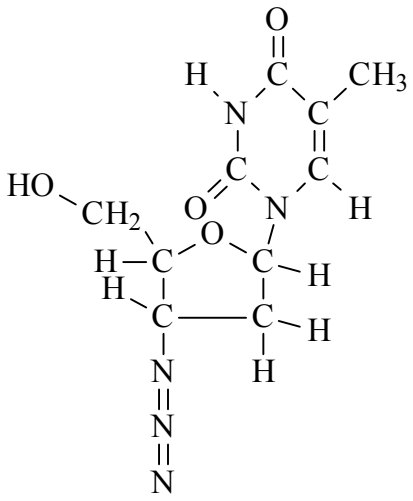
SF_6

F-S-S-F

F_3S-SF

SO_3^{2-}

2. (16 points) One of the first drugs to be approved for the treatment of AIDS is azidothymidine (AZT)



a. How many carbons are sp^3 hybridized? _____

b. How many carbons are sp^2 hybridized? _____

c. Circle the atom that is sp hybridized

d. How many F bonds are in the molecule? _____

e. How many B bonds are in the molecule? _____

f. What is the N-N-N bond angle? _____

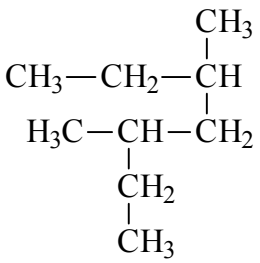
g. What is the H-O-C bond angle? _____

h. What is the hybridization of the oxygen in the CH_2OH group _____

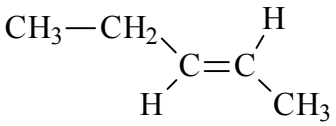
3. (12 points) Using the molecular orbital model, write electron configurations for the following diatomic species, calculate the bond order for each species, and determine which species are diamagnetic and paramagnetic

CN^+ CN CN^-

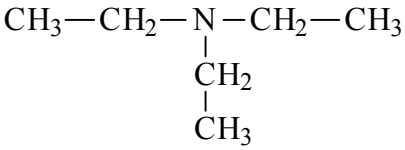
4. (12 points) Name the following organic chemicals:



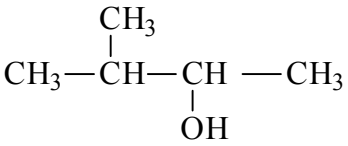
A_____



B._____



C._____



D._____

5. (12 points) Draw structures of the following compounds

A. 4-methyl-2-pentyne

B. hexanal

C. *m*-dinitrobenzene

D. 1,3 dimethylcyclohexane

6. (2 points) Give a balanced chemical equation for a combustion reaction involving an alkane.

7. (2 points) Give a balanced chemical reaction for a substitution reaction involving an aromatic hydrocarbon

8. (2 points) Give a balanced chemical reaction for an addition reaction involving an alkene.

9. (2 points) What is meant by the terms Cracking and catalytic reforming, and why are they used in the refining of petroleum

10. (2 points) PVC is polyvinyl chloride. The monomer form of this polymer is vinyl cholride, the structure shown. What is the structure of the polymer?