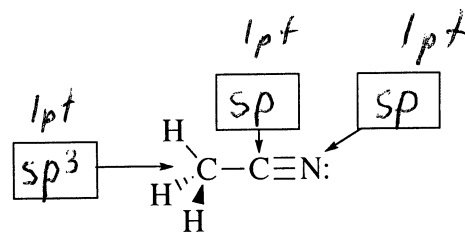


(Key)

1. (2) What is an approximate C-C-C bond angle in propyne, $\text{CH}_3\text{C}\equiv\text{CH}$ (circle correct answer):

2
109.5° 180° 160° 140° 120° 90° 60°

2. (3) What is hybridization of the carbon and nitrogen atoms of acetonitrile, CH_3CN ? Place correct answers in each box (1 pt each):



3. (2) Which atomic orbitals overlap to form the carbon-oxygen σ bond and π bond of formaldehyde, $\text{H}_2\text{C}=\text{O}$ (circle correct answer):

2
 $\sigma: sp^3 + sp^3$
 $\pi: p + p$

$\sigma: sp^2 + sp^2$
 $\pi: sp^2 + sp^2$

$\sigma: sp^2 + sp^2$
 $\pi: p + p$

$\sigma: sp^3 + sp^3$
 $\pi: sp^2 + sp^2$

4. (2) Circle the structure of the compound that has dipole moment $\mu = 0$ D:

2
 CH_3OH

NH_3

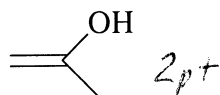
H_2O

CHCl_3

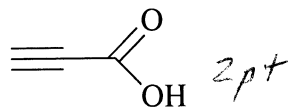
CH_2Cl_2

CCl_4

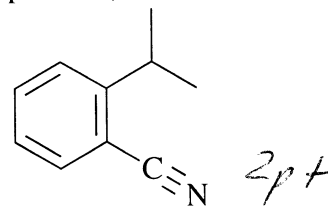
5. (6) Write molecular formulas for each of the following skeletal structures (2 pts each):



$\text{C}_3\text{H}_6\text{O}$



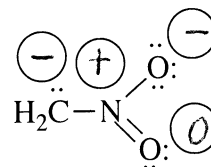
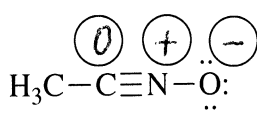
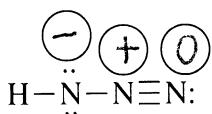
$\text{C}_3\text{H}_2\text{O}_2$



$\text{C}_{10}\text{H}_{11}\text{N}$

(write correct molecular formula $\text{C}_x\text{H}_y\text{O}_z$ or $\text{C}_x\text{H}_y\text{N}_z$ in box under each structure)

6. (10 pts) Place correct formal charges on atoms by writing 0, -, or + in each circle (1 pt each):



1 pt each circle

Overall Score: 25