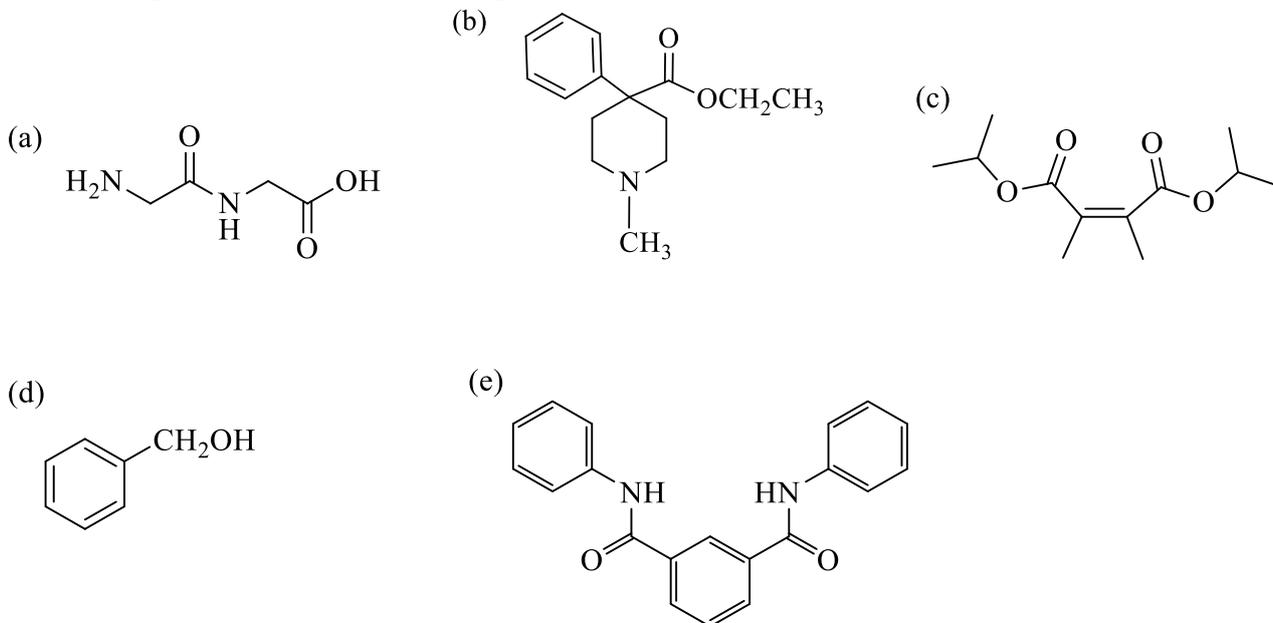


Problem Set 1
Physical Science

1) Classify each of the following compounds (จงระบุหมู่ฟังก์ชันของสารต่อไปนี้)

- (a) $\text{CH}_3\text{CH}_2\text{CONHCH}_3$ (b) $(\text{CH}_3\text{CH}_2)_2\text{NH}$ (c) $(\text{CH}_3)_3\text{CCOOH}$
 (d) $(\text{CH}_3\text{CH}_2)_2\text{O}$ (e) $\text{CH}_3\text{CH}_2\text{COOCH}_3$ (f) $\text{CH}_2=\text{CHCH}_2\text{OH}$

2) Circle the functional groups in the following structures. State to which class (or classes) of compounds the structure belongs



3) Predict the hybridization, geometry, and bond angles for the carbon and nitrogen atoms in:

- (a) $\text{CH}_3\text{CH}=\text{CHCH}_3$ (b) $\text{CH}_3\text{CH}=\text{NH}$ (c) $\text{CH}_3-\text{C}\equiv\text{N}$

4) Consider the following compounds;

- a) NH_3 b) CH_3OCH_3 c) H_2CCO d) CH_3COOH
 e) CH_4 f) $\text{H}_2\text{C}=\text{CH}_2$ g) CH_3COCH_3 h) SiCl_4

4.1) Draw a Lewis structure for each compound.

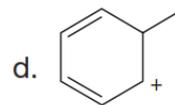
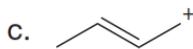
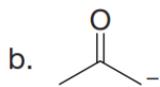
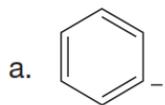
4.2) Label the hybridization, geometry, and bond angles around each atom other than hydrogen.

4.3) Draw a three-dimensional representation (using wedges and dashed lines) of the structure.

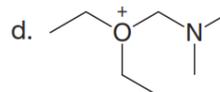
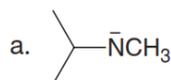
~~5) Draw a three-dimensional orbital representation for each of the following molecules, indicate whether each bond in it is a σ or π bond, and provide the hybridization for each non-hydrogen atom.~~

- ~~(a) CH_2O (b) $\text{H}_2\text{C}=\text{CHCH}=\text{CH}_2$ (c) $\text{H}_2\text{C}=\text{CH}=\text{CH}=\text{CH}_2$~~

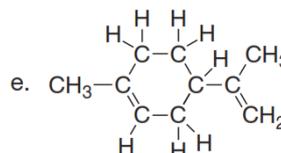
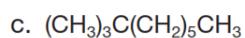
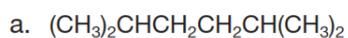
6) Draw in all the hydrogen atoms and nonbonded electron pairs in each ion.



7) Draw in all H atoms and lone pairs in each ion.



8) Convert each molecule into a skeletal structure. (เปลี่ยนโครงสร้างที่แสดงด้านล่างนี้ ให้กลายเป็นสูตรแบบเส้น)



limonene
(oil of lemon)

