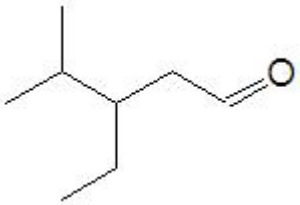
Name: _____ Class: _____ Date: _____

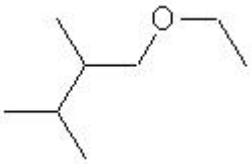
1. Give the IUPAC name of the following molecules

(a)

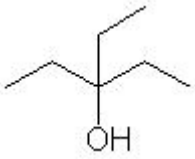


(b)

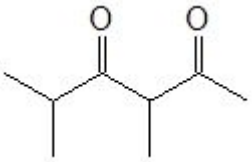
(c)



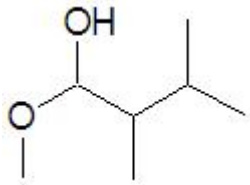
(d)



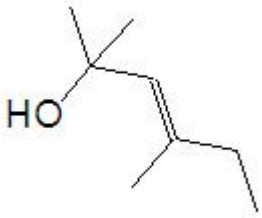
(e)



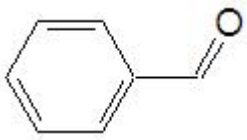
(f)



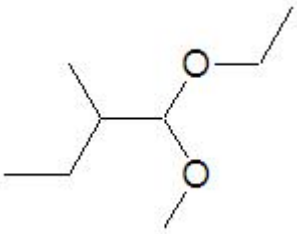
(g)



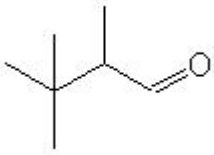
(h)



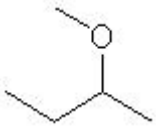
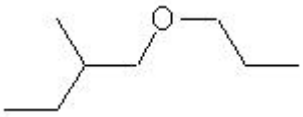
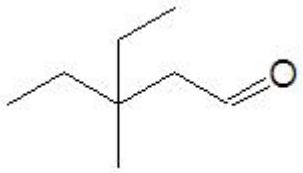
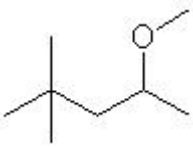
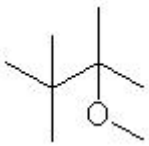
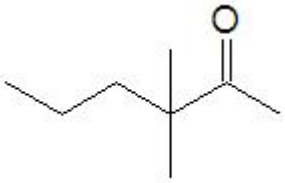
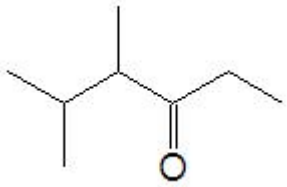
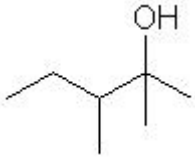
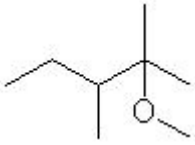
(i)



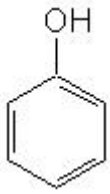
(j)



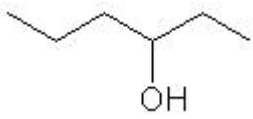
2. Give the IUPAC name of the following molecules

(a) 	(b) 
(c) 	(d) 
(e) 	(f) 
(g) 	(h) 
(i) 	(j) 

3. Give the IUPAC name of the following molecules

(a) 

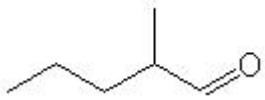
3(a) _____

(b) 

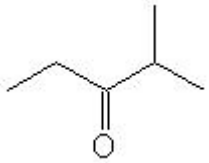
3(b) _____

(c) 

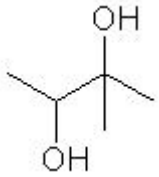
3(c) _____

(d) 

3(d) _____

(e) 

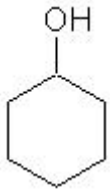
3(e) _____

(f) 

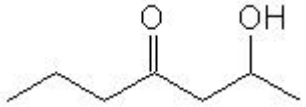
3(f) _____

(g) 

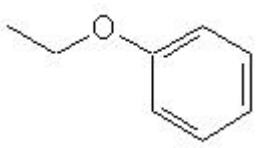
3(g) _____

(h) 

3(h) _____

(i) 

3(i) _____

(j) 

3(j) _____

4. Draw the following organic molecules:
   (a) 2-ethoxy-2-methylpropane

   (b) 3,4-dimethyl-1-pentanol

   (c) 2,4-dimethylhexanal

   (d) 2,2-dimethyl-3-pentanone

   (e) phenol

   (f) 1-hydroxy-1-butoxyethane

   (g) 2,2,3,3-tetramethylbutanal

   (h) 5-methyl-2-heptanone

   (i) 1,2-butanediol

   (j) 3-hexynal

5. Draw the following organic molecules:
   (a) 3-heptanol

   (b) 3-pentanone

   (c) 2-methyl-2-pentanol

   (d) 2-ethyl-1-pentanol

   (e) 2-methoxy-3-methylpentane

   (f) 3-ethyl-4-methylpentanal

   (g) 2,2-dimethyl-3-hexanone

   (h) 3-methoxy-3-ethylpentane

   (i) 3-ethyl-2-methylpentanal

   (j) 2,4-dimethyl-2-pentanol

6. Draw the following organic molecules:
   (a) Benzaldehyde

   (b) 2-methyl-3-phenylbutanal

   (c) cyclopentanone

   (d) Primary Alcohol

   (e) Secondary Alcohol

   (f) Tertiary Alcohol

   (g) Hemiacetal

   (h) Acetal

   (i) Hemiketal

   (j) Ketal

7. Fill in the class of compound for each missing product(s) or reactant(s). If no reaction occurs place a NR in the blank.

   (a) _____ $\xrightarrow{[O]}$ Aldehyde

   (b) _____ + $2\,Cu^{2+}$ $\xrightarrow[H_2O]{NaOH}$ Carboxylic Acid Salt + $Cu_2O(s)$

   (c) Aldehyde + Ketone $\xrightarrow{[\text{dillute NaOH}]}$ _____

   (d) Hemiacetal + Alcohol $\xrightleftharpoons{[\text{dryHCl}]}$ _____

   (e) Aldehyde $\xrightarrow{[O]}$ _____

   (f) _____ $\xrightarrow{[O]}$ Ketone

   (g) _____ + _____ $\xrightleftharpoons{[\text{dryHCl}]}$ Hemiketal

   (h) _____ + $2\,Ag^{+}$ $\xrightarrow[H_2O]{NH_3}$ No Reaction

   (i) Secondary Alcohol $\xrightarrow{[-H_2O]}$ _____ + H_2O

   (j) Ketone $\xrightarrow{[O]}$ _____

   (k) Tertiary Alcohol $\xrightarrow{[O]}$ _____

   (l) Ketone $\xrightarrow[\Delta]{H_2/Ni_2}$ _____

   (m) _____ + HCN $\xrightarrow{[OH^-]}$ Cyanohydrin

   (n) _____ + _____ $\xrightleftharpoons{[H^+]}$ Ester + H_2O

   (o) _____ + _____ $\xrightarrow{[-H_2O]}$ Ether + H_2O

   (p) Aldehyde $\xrightarrow[\Delta]{H_2/Ni_2}$ _____

8. Fill in the class of compound for each missing product(s) or reactant(s). If no reaction occurs place a NR in the blank.

(a) _____ + _____ $\xrightarrow{[-H_2O]}$ Ether + H_2O

(b) Hemiketal + Alcohol $\underset{\longleftarrow}{\overset{[\text{dryHCl}]}{\rightleftharpoons}}$ _____

(c) Tertiary Alcohol $\xrightarrow{[-H_2O]}$ _____ + H_2O

(d) _____ $\xrightarrow{[O]}$ Carboxylic Acid

(e) _____ + _____ $\underset{\longleftarrow}{\overset{[H^+]}{\rightleftharpoons}}$ Ester + H_2O

(f) Aldehyde + Alcohol $\underset{\longleftarrow}{\overset{[H^+]}{\rightleftharpoons}}$ _____

(g) Aldehyde $\xrightarrow[\Delta]{H_2/N_2}$ _____

(h) Primary Alcohol $\xrightarrow{[O]}$ _____

(i) Aldehyde + $2\,Ag^+$ $\xrightarrow[H_2O]{NH_3}$ _____ + 2 Ag (s)

(j) Ketone $\xrightarrow[\Delta]{H_2/N_2}$ _____

(k) Tertiary Alcohol $\xrightarrow{[O]}$ _____

(l) Secondary Alcohol $\xrightarrow{[O]}$ _____

(m) _____ + _____ $\xrightarrow{[\text{dillute NaOH}]}$ Aldol

(n) _____ $\xrightarrow{[-H_2O]}$ Alkene + H_2O

(o) _____ + HCN $\xrightarrow{[OH^-]}$ Cyanohydrin

(p) _____ + _____ $\underset{\longleftarrow}{\overset{[\text{dryHCl}]}{\rightleftharpoons}}$ Acetal

(q) _____ + $2\,Cu^{2+}$ $\xrightarrow[H_2O]{NaOH}$ Carboxylic Acid Salt + Cu_2O(s)

(r) Ketone + _____ $\underset{\longleftarrow}{\overset{[H^+]}{\rightleftharpoons}}$ Hemiketal

9. Complete the following reactions by filling in the missing reactants or products. If No Reaction occurs write NR. You may find it helpful to write the type of reaction or draw structures, please feel free too.

   (a) Aldehyde $\xrightarrow[\Delta]{H_2/N_2}$ _____

   (b) Primary Alcohol $\xrightarrow{[O]}$ _____

   (c) Aldehyde + Ketone $\xrightarrow{[\text{dillute NaOH}]}$ _____

   (d) Ketone $\xrightarrow{[O]}$ _____

   (e) Primary Alcohol + Primary Alcohol $\xrightarrow{[-H_2O]}$ _____ + H_2O

   (f) _____ $\xrightarrow[\Delta]{H_2/N_2}$ Secondary Alcohol

   (g) Tertiary Alcohol $\xrightarrow{[-H_2O]}$ _____ + H_2O

   (h) Primary Alcohol + Carboxylic Acid $\rightleftharpoons^{[H^+]}$ _____ + H_2O

   (i) Hemiacetal + _____ $\rightleftharpoons^{[\text{dryHCl}]}$ Acetal

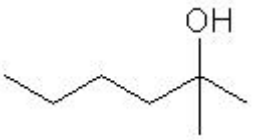
   (j) _____ $\xrightarrow{[O]}$ Carboxylic Acid

   (k) _____ + Alcohol $\rightleftharpoons^{[\text{dryHCl}]}$ Ketal

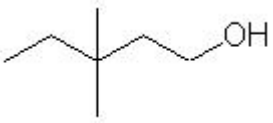
   (l) Aldehyde $\xrightarrow{[O]}$ _____

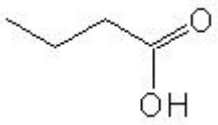
   (m) _____ $\xrightarrow{[O]}$ Ketone

10. Complete the following reactions by drawing the structure of the product(s). If no reaction occurs write "NR" in the space provided. Half credit will be awarded if you label the class of compound for both the reactants and products and tell what class of reaction occurs (ie the reaction mechanism).

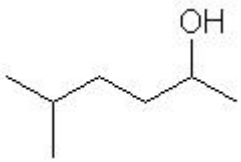
(a) 

$\xrightarrow{[O]}$

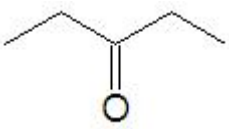
(b) 

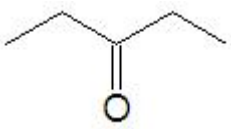
+ 

$\rightleftharpoons^{[H^+]}$

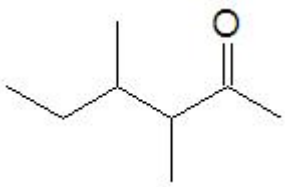
(c) 

$\xrightarrow{[O]}$

(d) 

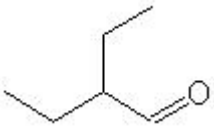
+ 

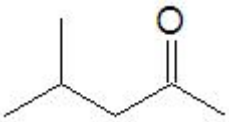
$\xrightarrow{[\text{dillute NaOH}]}$

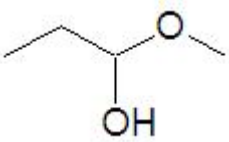
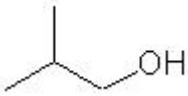
(e) 

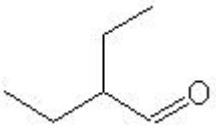
$\xrightarrow{[O]}$

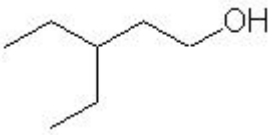
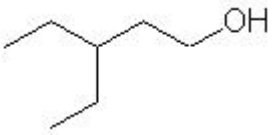
11. Complete the following reactions by drawing the structure of the product(s). If no reaction occurs write "NR" in the space provided. Half credit will be awarded if you label the class of compound for both the reactants and products and tell what class of reaction occurs (ie the reaction mechanism).

(a)  $\xrightarrow{[O]}$

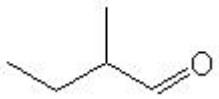
(b)  + HCN $\xrightarrow{[OH^-]}$

(c)  +  $\xrightarrow[\longleftarrow]{[\text{dryHCl}]}$

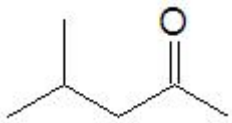
(d) $\xrightarrow{[O]}$ 

(e)  +  $\xrightarrow{[-H_2O]}$

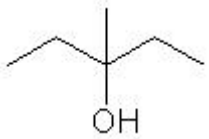
12. Complete the following reactions by drawing the structure of the product(s). If no reaction occurs write "NR" in the space provided. Half credit will be awarded if you label the class of compound for both the reactants and products.

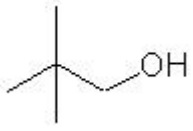
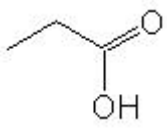
(a)  $\xrightarrow[\Delta]{H_2/N_2}$

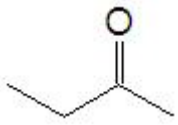
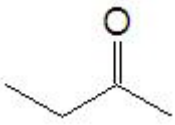
(b)  $\xrightarrow{[O]}$

(c)  $\xrightarrow{[O]}$

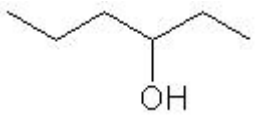
(d)  +  $\xrightarrow{[-H_2O]}$

(e)  $\xrightarrow{[-H_2O]}$

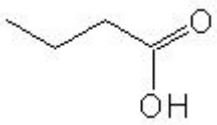
(f)  +  $\xrightleftharpoons{[H^+]}$

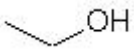
(g)  +  $\xrightarrow{[\text{dillute NaOH}]}$

13. Complete the following reactions by filling in the missing reactants or products. If No Reaction occurs write NR. You may find it helpful to write the type of reaction, the class of the reactants or products, or draw structures, please feel free too.

(a)  $\xrightarrow{[O]}$ $\xrightarrow{[O]}$

(b)  + HCN $\xrightarrow{[OH^-]}$

(c)  +  $\xrightarrow{[-H_2O]}$

(d)  +  $\xrightleftharpoons{[H^+]}$

(e) + $\xrightarrow{[-H_2O]}$  + H_2O