

### Quiz #1

1. \_\_\_\_\_ 25 pts  
2. \_\_\_\_\_ 25 pts  
3. \_\_\_\_\_ 25 pts  
4. \_\_\_\_\_ 25 pts  
100 pts

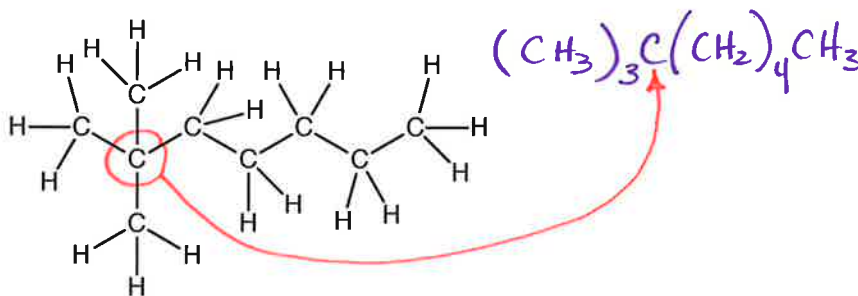
**Please work carefully and draw clearly!**

Life is messy. Science is not all straight logic. And all scientists are not always logical. We're just scrabblers for knowledge and understanding.

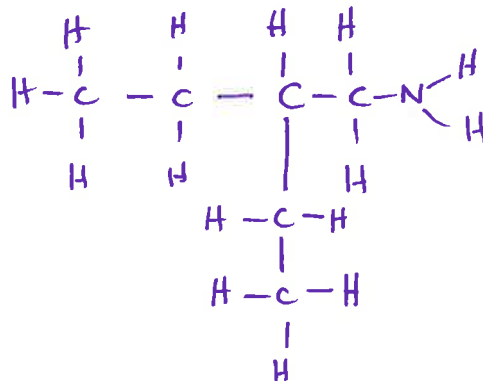
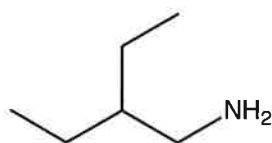
Roald Hoffmann  
Quoted in DOI: 10.1021/acs.joc.5b01792

1. (25 points). Redraw in the style as indicated.

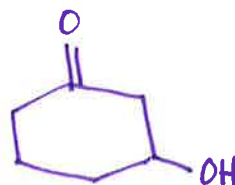
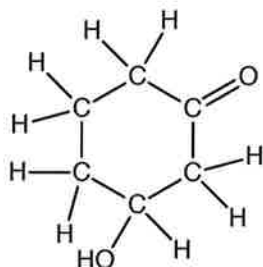
5 pts each



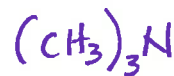
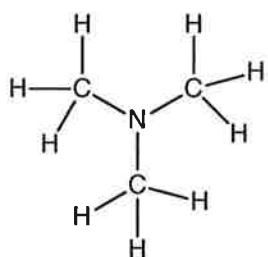
- (a) Write as a condensed formula:



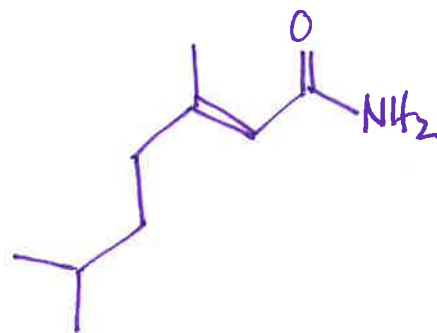
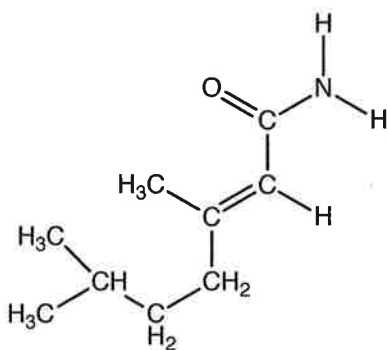
- (b) Convert to an expanded structure:



- (c) Draw in bond-line style:

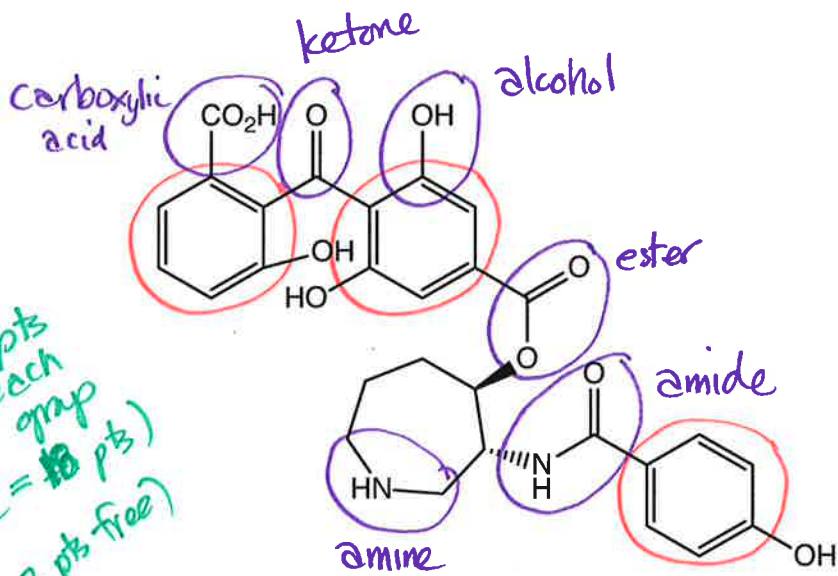


(d) Write as a condensed formula:



(e) Draw in bond-line style:

2. (25 points). A molecule called balanol is shown below. Balanol is made by a fungus and has interesting biological activities.

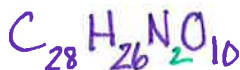


There are also 3 aromatic rings (in red!) but you don't have to mark those.

-3 pts each group  
(= 18 pts)  
(2 pts free)

- Circle and categorize the functional groups present in balanol. If a functional group occurs more than once, you only need to mark it once.
- What is the molecular formula of this molecule?

5 pts

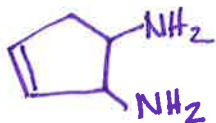


18 pts possible  
+ bonus

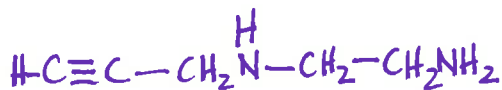
$$\text{IHD} = 5 - \frac{1}{2}(10) + \frac{1}{2}(2) + 1 = 2$$

3. (25 points). Calculate the IHD and draw four isomers for  $\text{C}_5\text{H}_{10}\text{N}_2$ .

many possibilities!



5 pts for IHD  
5 pts each  
correct isomer

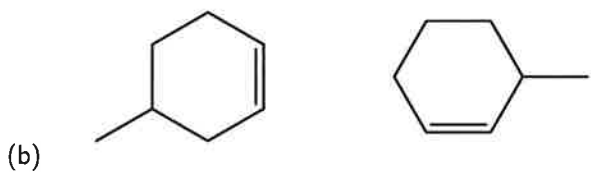


4. (25 points). First, answer question (a). Then, for each pair below, state whether the two representations are the same molecule, or different molecules. If you think they are different, state how they are different (use the ideas in your answer to part (a)).

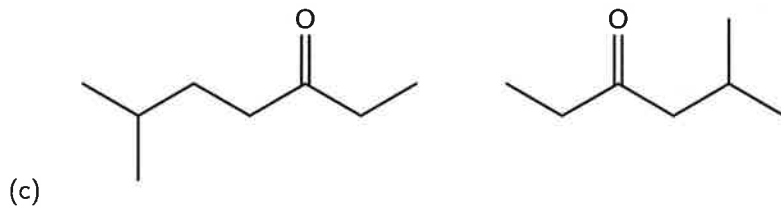
(a) For two molecules to be the same (identical), what conditions must be true? Short answer only.

1) same molecular formula 2) same connectivity

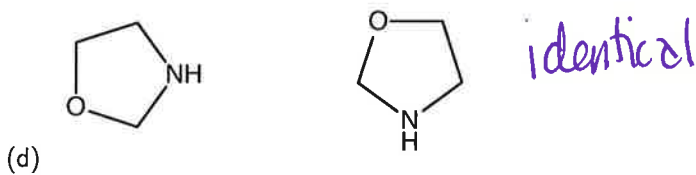
5 pts  
each



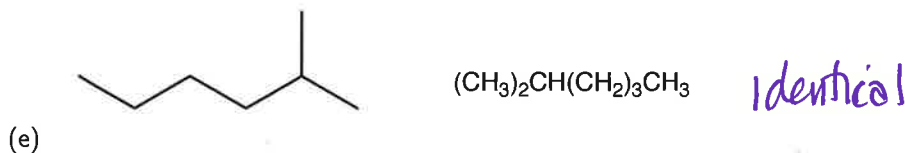
different:  $-\text{CH}_3$  group is connected at a different location relative to the alkene



different: one has  $\text{C}_7$  + the other  $\text{C}_8$



identical



identical