Summer 19: Organic 1 Exam 1 **Ch 1-4** **50 points**

Name _____

1-10 are True / False. (10pts)

1) Organic chemistry is the study of carbon containing compounds.

2) A triple bond has two π bonds and one σ bond.

3) Equilibrium constant is related to the change in Gibbs free energy.

4) Chlorine has a smaller atomic radius than Iodine.

5) Cyclopropane has more ring strain than cyclopentane.

6) Aluminum has 5 valence electrons.

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8) The conjugate base of Nitric Acid (HNO_3) is the NO_3^- anion.

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10) An ionic bond must contain ions.

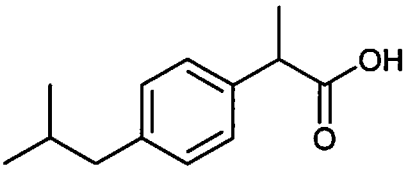
11) Circle the **acid** on the left hand side of each of these equations. (2pts)

(a) $HBr + H_2O \rightarrow H_3O^+ + Br^-$

(b) $CH_3CH_2OH + NaOH \rightarrow CH_3CH_2ONa + H_2O$

12) Define a LEAVING GROUP. (2pts)

13) (9pts) For the following molecule, calculate the number of …



a) carbon atoms

b) hydrogen atoms

c) π bonds

d) oxygen atoms

e) sp^2 hybridized carbons

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g) carbons in the ring

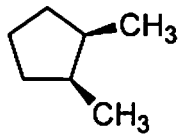
h) lone pairs (non bonding pairs) of electrons

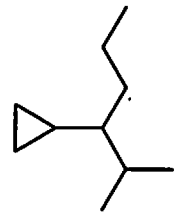
i) the O-C-O bond angle.

14) Draw the following molecule in line angle (*stick figure*) form. (3pts)

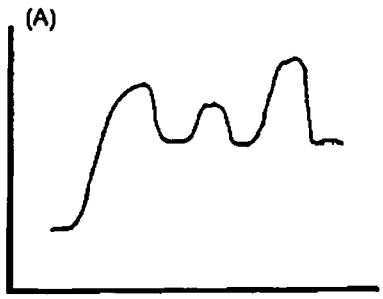
3-ethyl-2-methylheptane

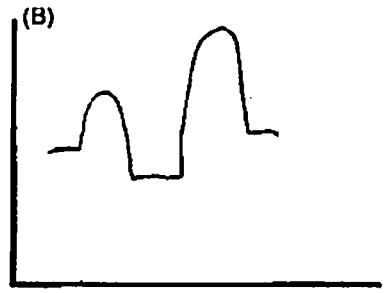
15) Name the following molecules in IUPAC form: (3+3pts)

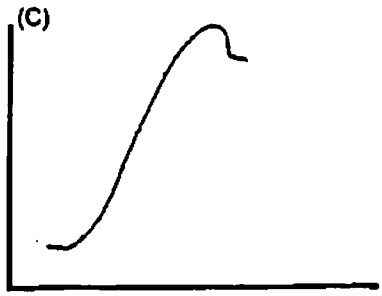


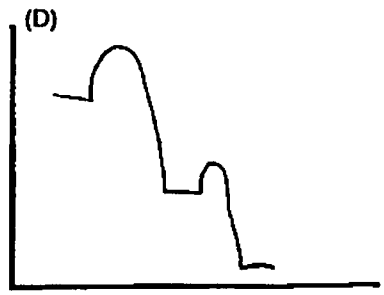


16) Using these four energy level diagrams (A-D), pick the most appropriate. (3pts)









a) which is the most *exothermic*?

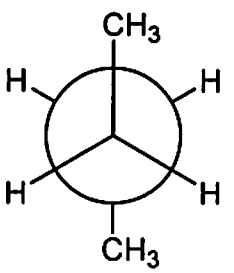
b) which has the most steps?

c) which has the *rate determining step* as the 2nd step?

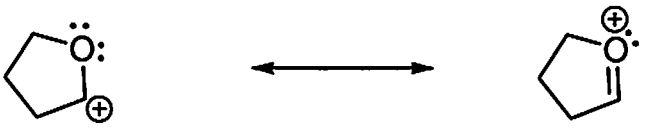
17) What is meant by the scientific term *radical species* (1pt)?

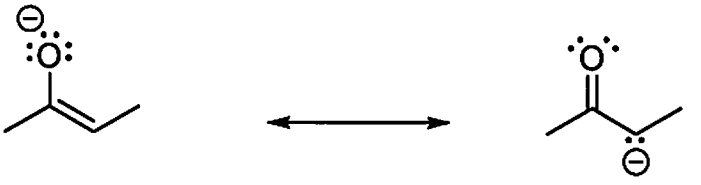
18) Draw any two molecules that are *isomers*, and **state** whether the pair you drew are *stereoisomers* or *structural isomers*. (2+1=3pts)

19) Redraw this Newman projection using sticks and wedges. (2pts)



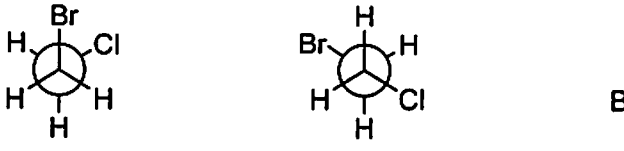
20) Show the electron movement (curly arrows) that convert the left resonance structure into the right hand side resonance form. (3pts)

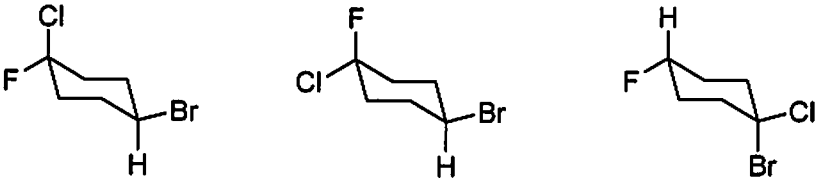
a) 

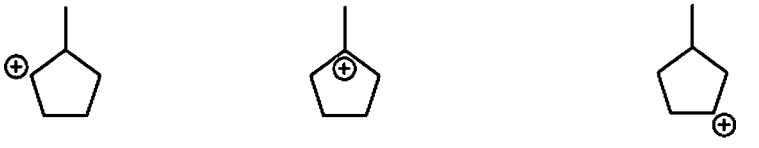
b) 

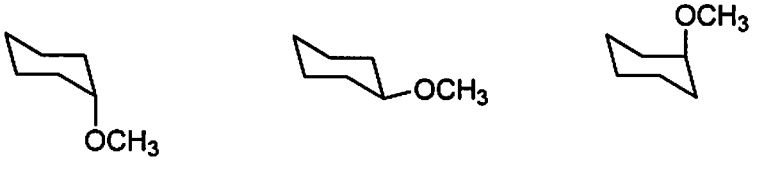
21) For part 20b, underline the major contributor. (1pt)

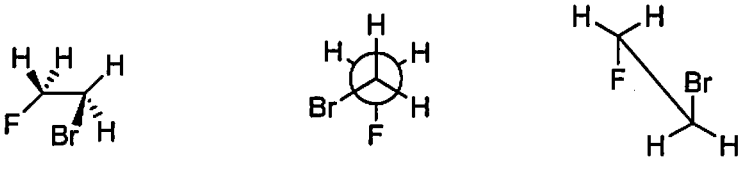
22) Circle the *most stable* member of each threesome. (5pts)

(a) 

(b) 

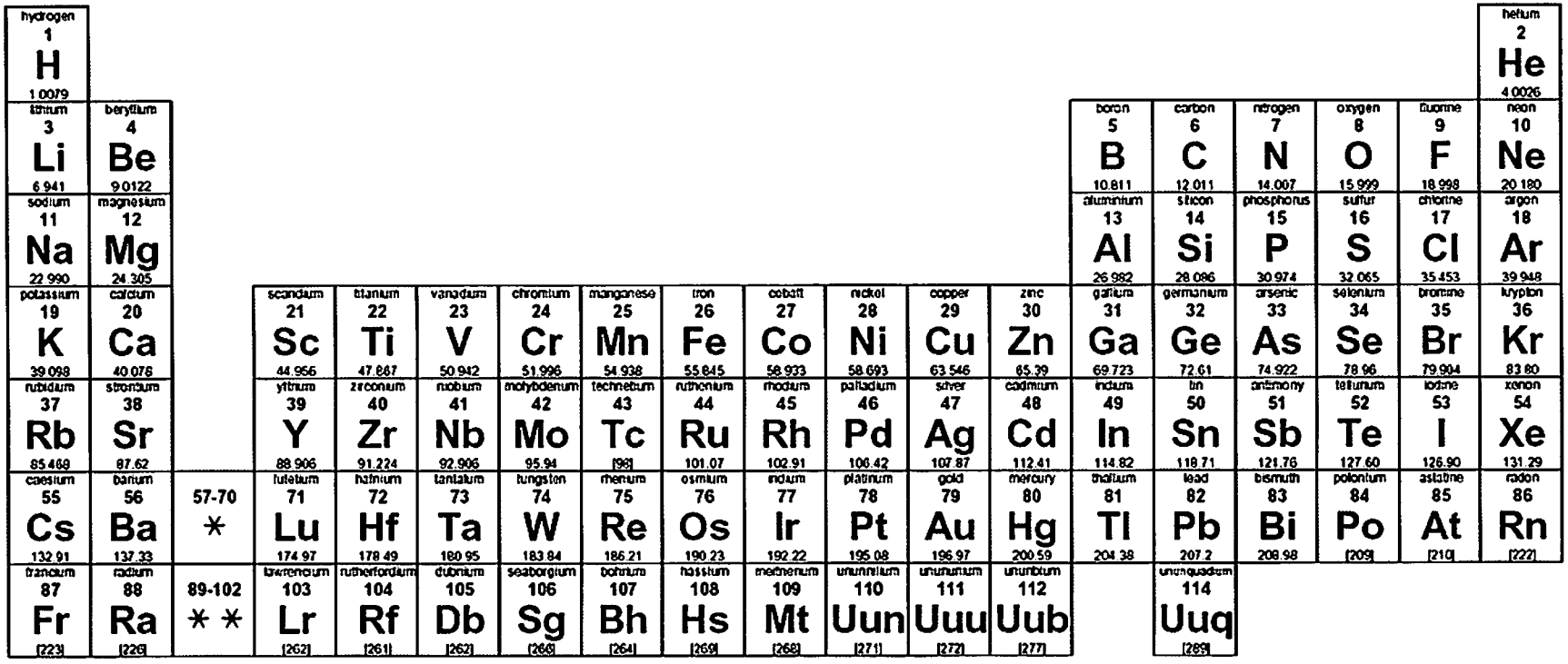
(c) 

(d) 

(e) 

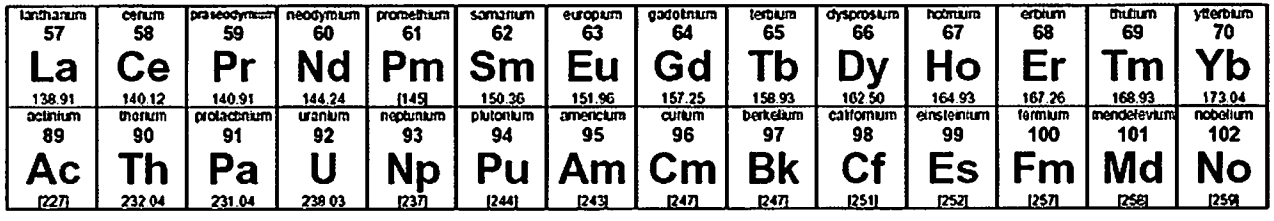
Bonus Question for up to 2 points

What do the initials **IUPAC** stand for?



*Lanthanide series

**Actinide series



Summer 19: Organic 1 Exam 1 **Ch 1-4** **50 points**

Name Sue Narmi

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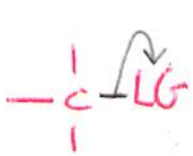
12) Define a LEAVING GROUP. (2pts)

A group that disconnects, taking with it the two previously bond electrons.



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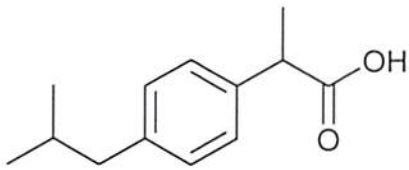

a) carbon atoms 13

b) hydrogen atoms 18

c) π bonds 4

d) oxygen atoms 2

e) sp^2 hybridized carbons 7

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g) carbons in the ring 6

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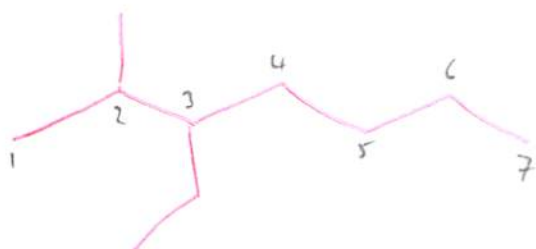
14) Draw the following molecule in line angle (*stick figure*) form. (3pts)

3-ethyl-2-methylheptane



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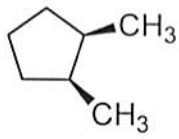
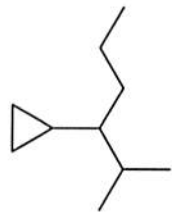
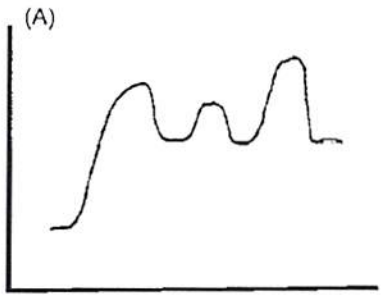


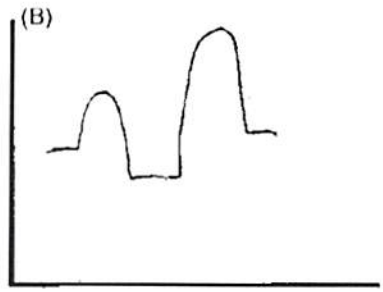
CIS -1,2-DIMETHYL CYCLOPENTANE

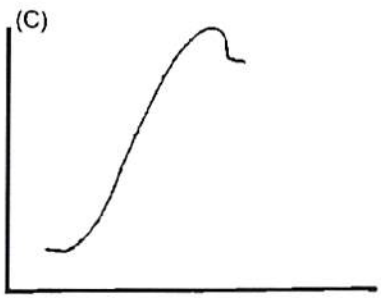


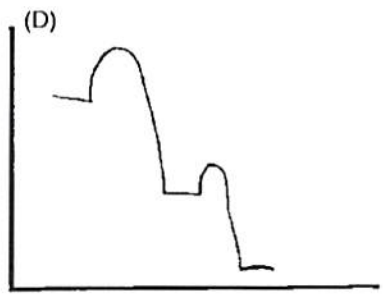
3-cyclopropyl-2-methylhexane

16) Using these four energy level diagrams (A-D), pick the most appropriate. (3pts)









a) which is the most *exothermic*? D

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17) What is meant by the scientific term *radical species* (1pt)?

A radical is a species with an odd number of valence electrons and therefore an unpaired electron.

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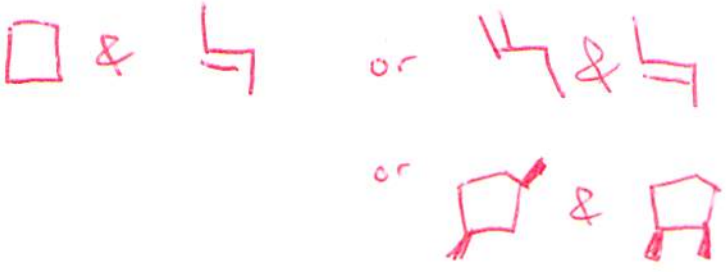
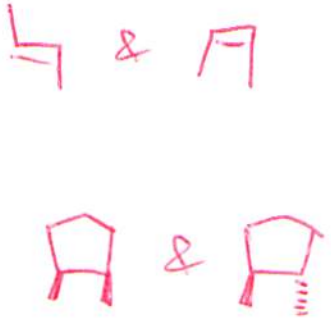
eg structural 

stereoisomer 

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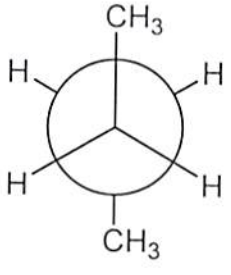

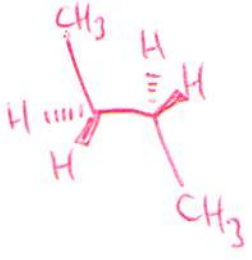

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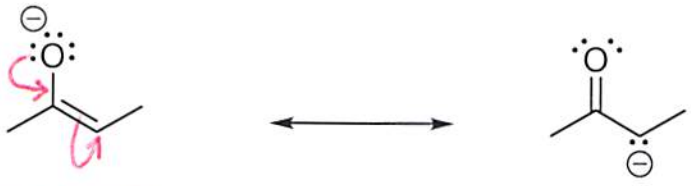
b) 

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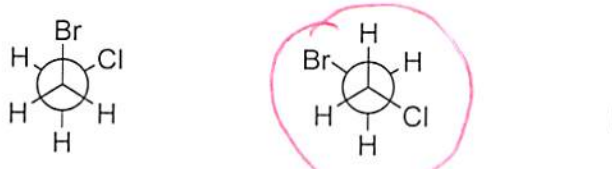
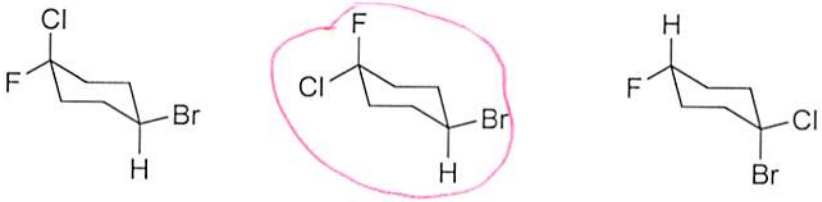
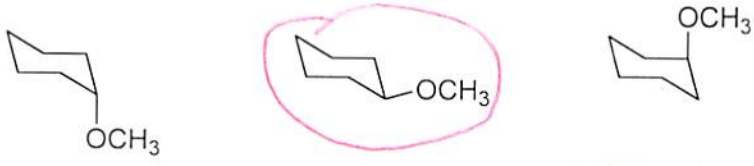
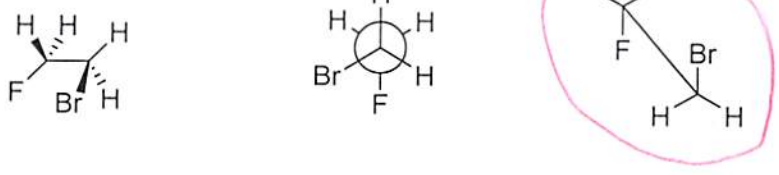
(a) 

(b) 

(c) 

(d) 

(e) 

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