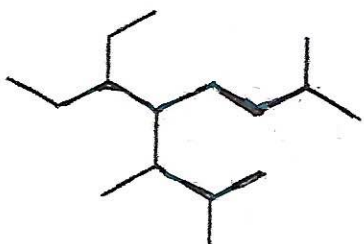


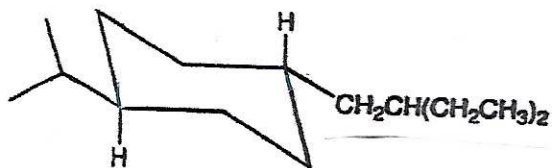
Alt Exam 1

1. Give an acceptable IUPAC name for each of the compounds in a-c. Draw the structure of the compound in d. Be sure to indicate the stereochemistry where appropriate. (16 points)

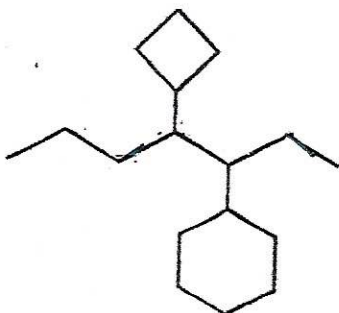
a.



b.



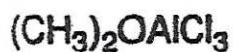
c.



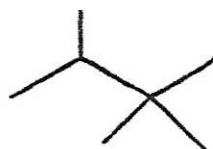
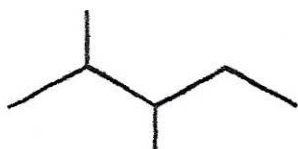
d. 5-sec-butyl-4-ethyl-3-neopentyldecane

+1 +1 +1 +1

2. Draw a proper Lewis structure for the condensed formula below. Be sure to show all lone pairs and formal charges. (5pts)

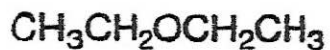


3. Place the compounds below in order of increasing melting point. (1=lowest, 3=highest melting point) (6 pts.)



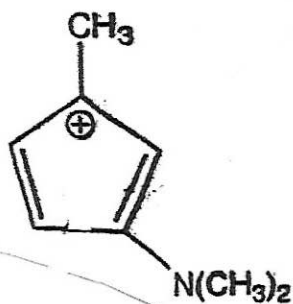
2pts each

4. Place the compounds below in order of increasing solubility in H_2O . (1=least soluble, 3=most soluble) (6 pts.)

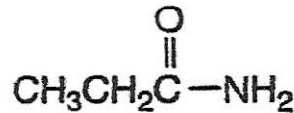
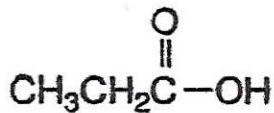
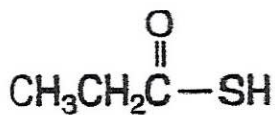


2pts each

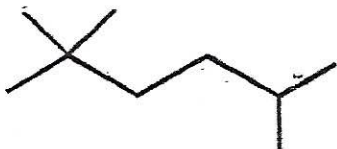
5. For the structure given below, draw the important resonance contributors. Circle the major contributor. (12 pts.)



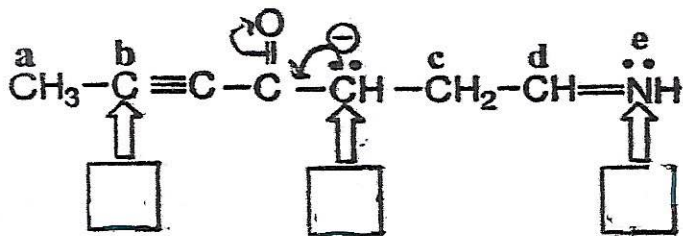
6. Place the compounds in order of increasing acidity. (1=least acidic, 3=most acidic) (6 pts.)



7. Draw all structural isomers resulting from the monobromination of 2,2,5-trimethylhexane (shown below). You will be penalized for duplicate structures. (10 pts.)



8. Consider the structure below and answer the following questions.



a. Write the hybridization of each atom indicated by an arrow in the box provided. (6 pts.)

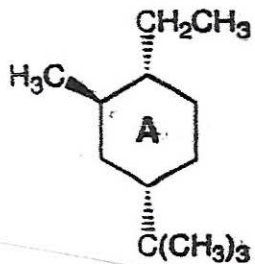
b. What is the $C_c-C_d-N_e$ bond angle? (2 pts.)

c. The sigma bond between the atoms labeled a and b is formed by the overlap of what types of orbitals? Be specific. (2 pts.)

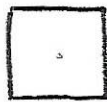
9. Viewing the molecule along the C3-C4 bond, construct the Newman projection of the least stable conformation of 3,4-dimethylheptane. (5 points)



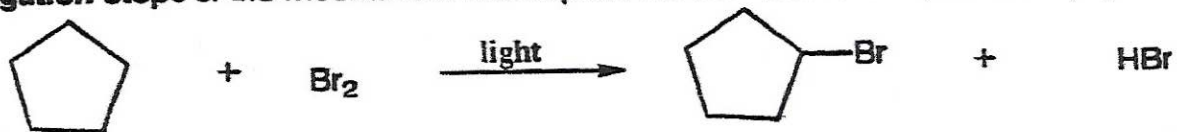
10. a. Draw the more stable chair conformation for each of the substituted cyclohexanes shown below. (8 points)



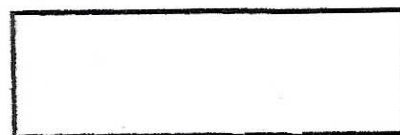
b. Which isomer is more stable? A or B? (2 points)



11. An equation representing the halogenation of an alkane is shown below. a) Provide the propagation steps of the mechanism that explain the formation of the products. (6 points)



b. Consider the termination steps, and provide a structure for a possible side product. (2pt.)



c. Given the bond dissociation energies (BDE) below, calculate the overall ΔH° for the reaction. You must show your work to receive credit! (4 points)

d. Are the products or reactants favored at equilibrium? (2 points)



<i>Bond-Dissociation Energy</i>		<i>Bond-Dissociation Energy</i>	
<i>Bond</i>	<i>kcal/mol</i>	<i>Bond</i>	<i>kcal/mol</i>
H—X bonds and X—X bonds		Bonds to secondary carbons	
H—H	104	(CH ₃) ₂ CH—H	95
D—D	106	(CH ₃) ₂ CH—F	106
F—F	38	(CH ₃) ₂ CH—Cl	80
Cl—Cl	58	(CH ₃) ₂ CH—Br	68
Br—Br	46	(CH ₃) ₂ CH—I	53
I—I	36	(CH ₃) ₂ CH—OH	91
H—F	136	Bonds to tertiary carbons	
H—Cl	103	(CH ₃) ₃ C—H	91
H—Br	88	(CH ₃) ₃ C—F	106
H—I	71	(CH ₃) ₃ C—Cl	79
HO—H	119	(CH ₃) ₃ C—Br	65
HO—OH	51	(CH ₃) ₃ C—I	50
Methyl bonds		(CH ₃) ₃ C—OH	91
CH ₃ —H	104	Other C—H bonds	
CH ₃ —F	109	PhCH ₂ —H (benzylic)	85
CH ₃ —Cl	84	CH ₂ =CHCH ₂ —H (allylic)	87
CH ₃ —Br	70	CH ₂ =CH—H (vinyl)	108
CH ₃ —I	56	Ph—H (aromatic)	110
CH ₃ —OH	91	C—C bonds	
Bonds to primary carbons		CH ₃ —CH ₃	88
CH ₃ CH ₂ —H	98	CH ₃ CH ₂ —CH ₃	85
CH ₃ CH ₂ —F	107	CH ₃ CH ₂ —CH ₂ CH ₃	82
CH ₃ CH ₂ —Cl	81	(CH ₃) ₂ CH—CH ₃	84
CH ₃ CH ₂ —Br	68	(CH ₃) ₃ C—CH ₃	81
CH ₃ CH ₂ —I	53		
CH ₃ CH ₂ —OH	91		
CH ₃ CH ₂ CH ₂ —H	98		
CH ₃ CH ₂ CH ₂ —F	107		
CH ₃ CH ₂ CH ₂ —Cl	81		
CH ₃ CH ₂ CH ₂ —Br	68		
CH ₃ CH ₂ CH ₂ —I	53		
CH ₃ CH ₂ CH ₂ —OH	91		