CHM 1240 EXAM 1 June 2, 2015

[redacted]

You must have the correct section number to earn credit for your exam.

[redacted]

Please write your answers neatly in the spaces provided. You may write in pencil if you decline the option of a re-grade. If you use a blue or black ink pen you retain the option of a re-grade. There are 12 questions. Useful atomic numbers: H=1, C=6, N=7, O=8, F=9, Cl=17 , Br=35

Academic Integrity Pledge

During the exam I will

- turn off my cell phone and put it away (out of sight and not on my person)
- close all books, notebooks, etc. and put them under the seat in which I sit
- keep my eyes down and focused on my own paper
- keep my answers covered
- sit in the area assigned to my section

I will stop writing when time is called.

I will hand in my paper when told to do so.

During the exam I will not

- have any papers other than those provided
- have any writing on my clothing or person or desk
- talk to anyone other than the instructor

I understand that the ***minimum consequence*** of any behavior contrary to this pledge is that I will receive a ***zero on this exam*** that will not be replaced by the percent earned on my final exam.

[redacted]

Scoring

13 IIIA	14 IVA	15 VA	16 VIA	17 VIIA	VIIIA 2 He 4.003
5 B 10.81	6 C 12.01	7 N 14.01	8 O 16.00	9 F 19.00	10 Ne 20.18
13 Al 26.98	14 Si 28.09	15 P 30.97	16 S 32.07	17 Cl 35.45	18 Ar 39.95
31 Ga 69.72	32 Ge 72.59	33 As 74.92	34 Se 78.96	35 Br 79.90	36 Kr 83.80

Page 2 31 / 34

Page 3 16 / 16

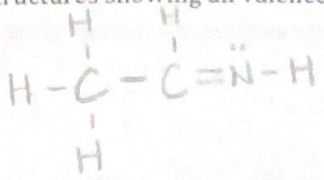
Page 4 25 / 28

Page 5 16 / 22

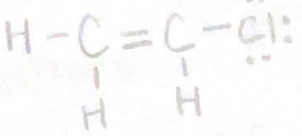
SUM 88 / 100

1. (8 pts) Draw Lewis structures showing all valence electrons for these molecules.

a) CH_3CHNH

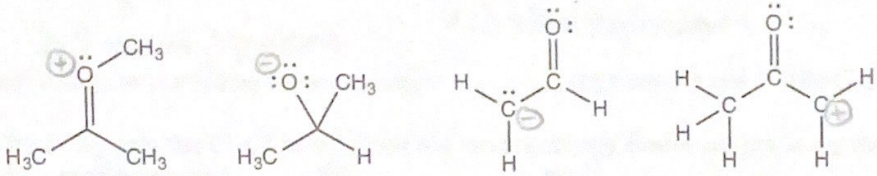


b) C_2H_3Cl



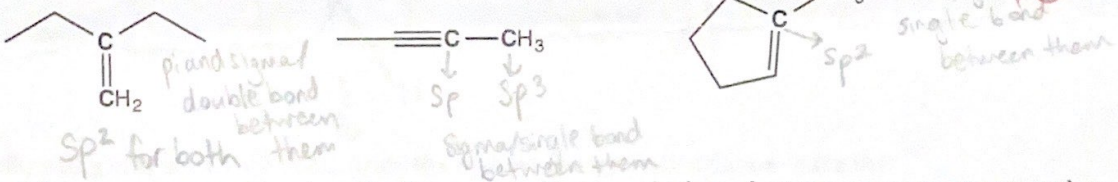
8

2. (8 pts) What is the formal charge on all non-zero atoms in each of the following compounds.



8

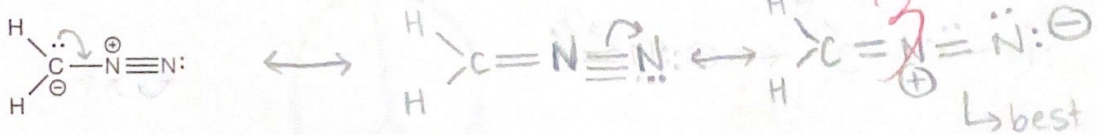
3. (6 pts) Describe the bonding (hybridization) in each of the carbon atoms drawn in BOLD.



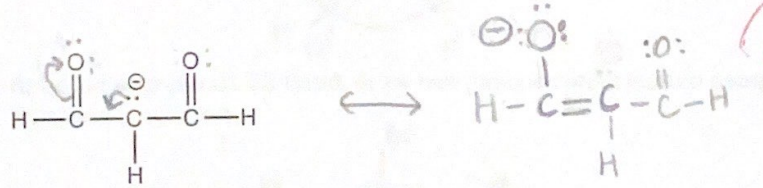
6

4. (12 pts) Draw a resonance structure for the compound given which is a better resonance structure than the one given.

a)

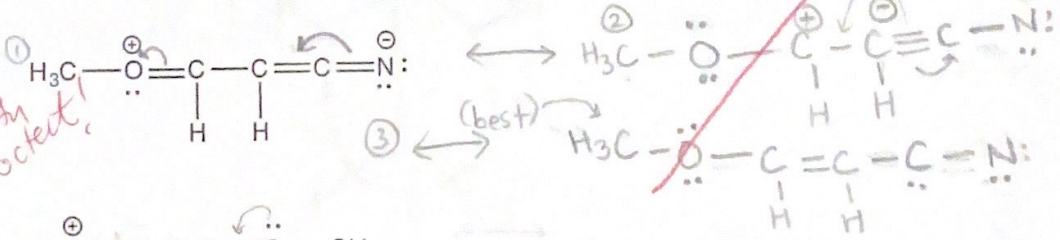


b)

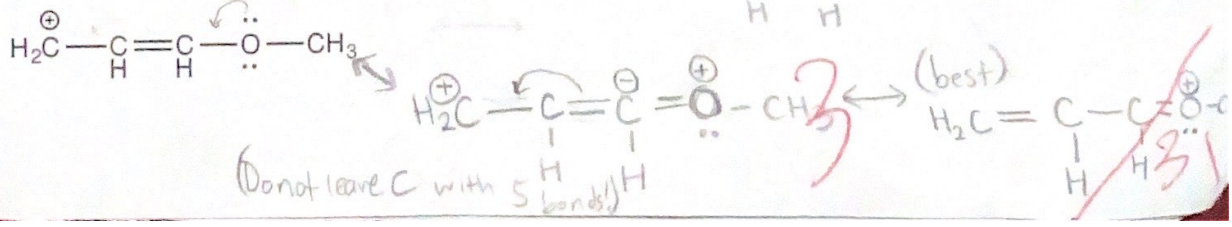


3

c)



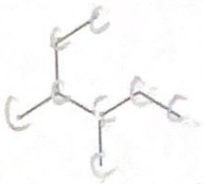
d)



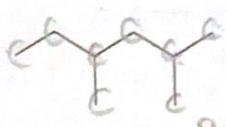
3

3

5. (4 pts) Do the line-angle structures (bond-line structures) in each pair represent the same compound or constitutional isomers?



and



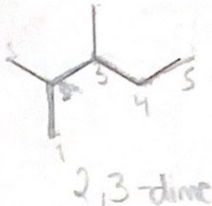
both are C_8H_{18}

Isomers 2

3,4-dimethylhexane

2,4-dimethylhexane

and



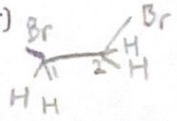
both are C_5H_{16}

Same Compound 2

2,3-dimethylpentane

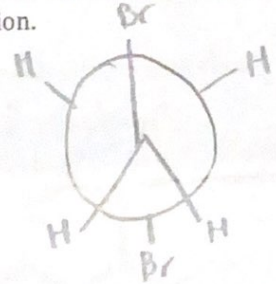
2,3-dimethylpentane

6. (12 pts) Consider the following compound – 1,2-dibromoethane ($Br\text{-}CH_2\text{-}CH_2\text{-}Br$)



Rotating only the C1-C2 bond, draw the lowest energy conformation using the Newman projection.

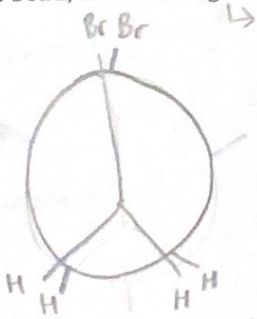
↳ anti



4

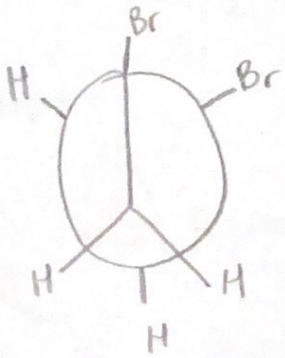
Rotating only the C1-C2 bond, draw the highest energy conformation using the Newman projection.

↳ Br-Br eclipse



4

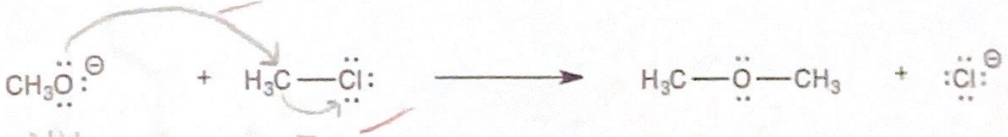
Rotating only the C1-C2 bond, draw one gauche conformation using the Newman projection.



4

7. (12 points) Label the reactants in these acid-base reactions as Lewis acids (electrophiles) or Lewis bases (nucleophiles). Use curved arrows to show the movement of electron pairs in the reactions.

a)

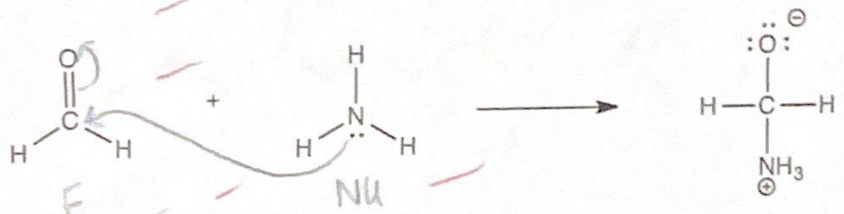


NU E

b)

NU E

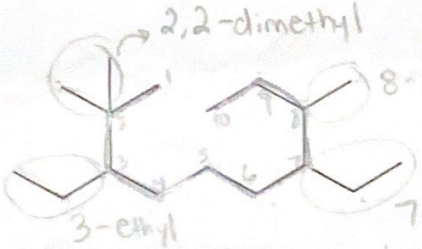
c)



E NU

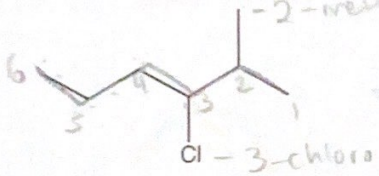
8. (4 pts each) Name the following compounds.

a)



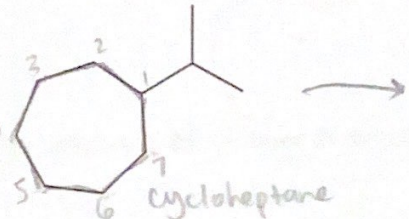
→ 3,7-diethyl-2,2,8-trimethyldecane

b)



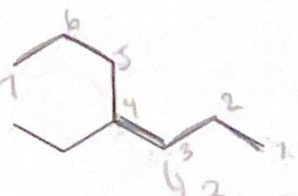
→ 3-chloro-2-methylhexane

c)



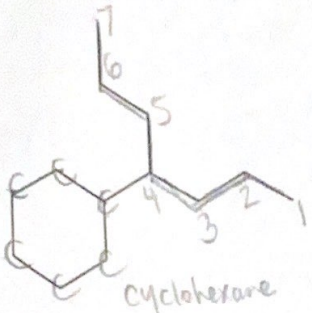
→ 1-isopropylcycloheptane

d)



(Z)-4-ethyl-3-heptene

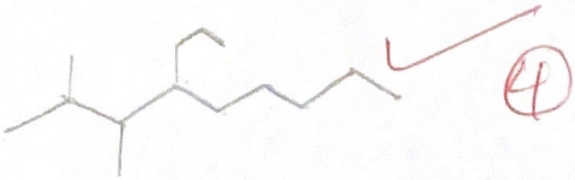
e)



4 - cyclohexylheptane

4

9. (4 pts) Draw 2,3-dimethyl-4-propylnonane

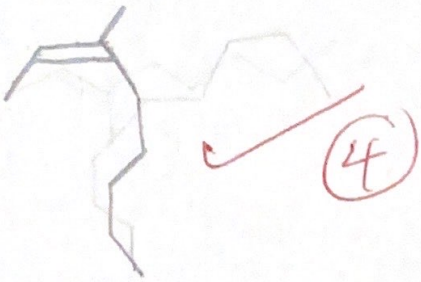


4

10. (4 pts) Draw *sec*-butylcyclohexane

not's in iso!

11. (4 pts) (Z)-3-methyl-2-octene



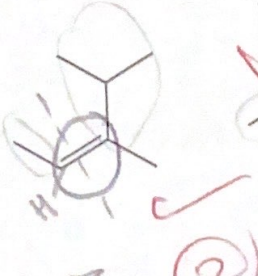
4

12. (4 pts) Label each double bond in the following compounds using cis or trans or E or Z.

Last one is E b/c secondary tertiary C!

Cis

2



Z

2