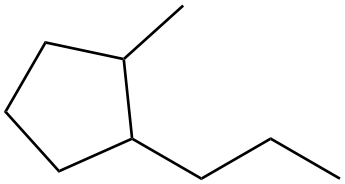
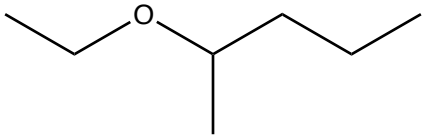
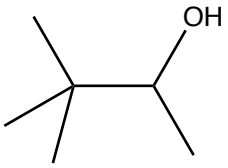
Name _____ Test 2 (11/4)
CHEM 0201 (Organic) Spring 2022

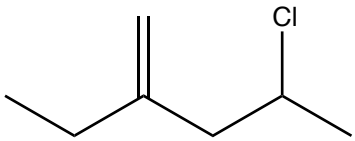
1.(6 pts. ea.) Provide IUPAC names for the following structures.

a. 

b. 

_____ _____

c. 



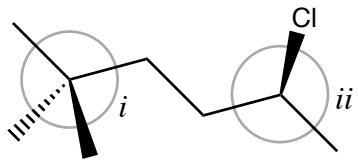
_____ _____

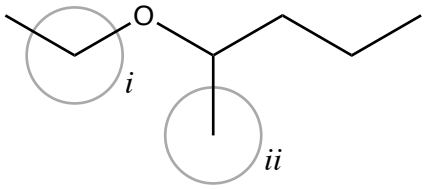
2. (10 pts.) Draw a skeletal structure for 3-methyl-1-pentanol.

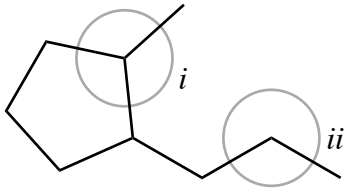
3. (10 pts.) The dipole moment of CH_2Cl_2 (methylene chloride) is 1.6 D and the dipole moment of $CH_3CH_2OCH_2CH_3$ (diethyl ether) is 1.15 D. Thus, CH_2Cl_2 is more polar than diethyl ether, which is reflected in their boiling points. On the other hand, diethyl ether is more soluble in water than CH_2Cl_2. Explain why diethyl ether is more soluble in water than CH_2Cl_2.

1. _____
2. _____
3. _____
4. _____
5. _____
6. _____
7. _____
8. _____
9. _____
10. _____

4. (12 pts.) The reactivity of carbon atoms often depends on their degree of substitution. For the following structures determine the degree of substitution (1°, 2°, 3°, or 4°) for the indicated C atoms.

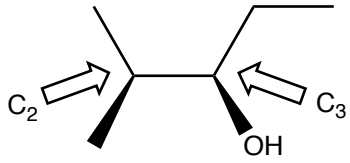


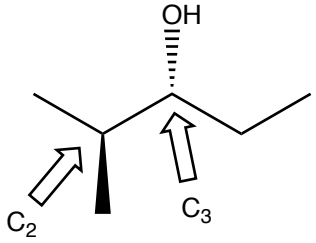




a. *i.* _____ *ii.* _____ b. *i.* _____ *ii.* _____ c. *i.* _____ *ii.* _____

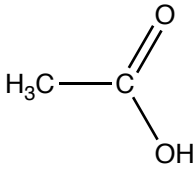
5. a. (12 pts.) Newman projections allow the viewer to visualize how groups attached to adjacent C atoms interact with each other. Draw the Newman projections along the C_2 to C_3 bond of the following rotamers of (*R*)-2-methyl-3-pentanol.

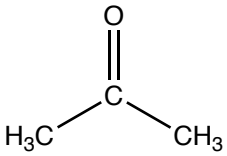


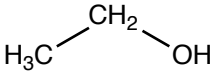


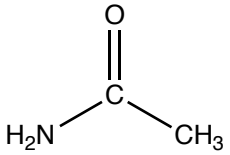
b. (6 pts.) Which rotamer is lower in energy?

6. (12 pts.) Identify the function group on each of the following structures; be as specific as possible.

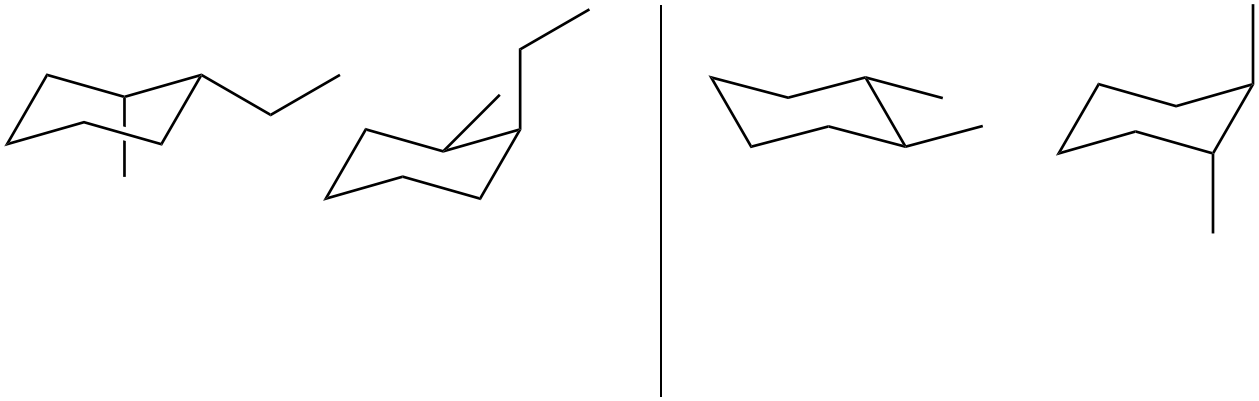








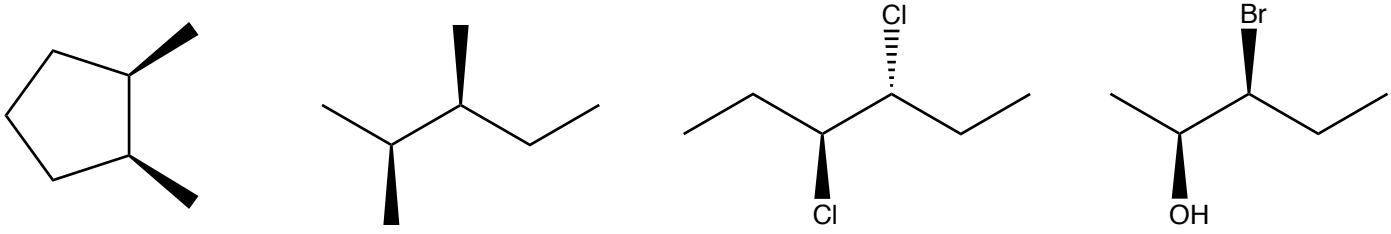
7. The single bonds in cyclic alkanes can partially rotate, and when all of the bonds in the ring partially rotate a ring flip results. **(a. 6 pts.)** For the following pairs of cyclohexane molecules determine whether the two structures represent the same but ring-flipped molecules and **(b. 6 pts.)** for each pair determine which would be the lower energy structure.

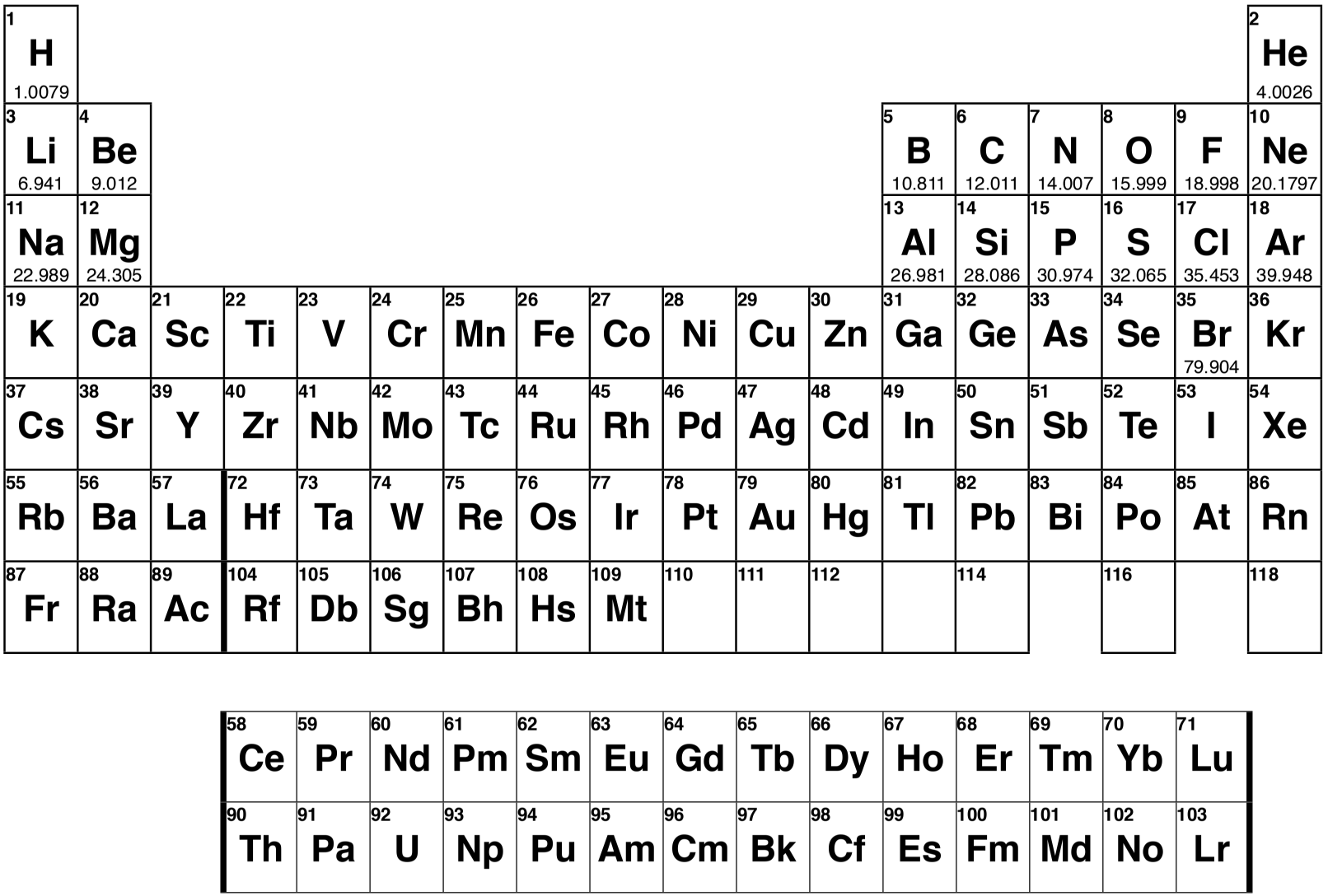


8. (12 pts.) Determine the stereochemical configurations (*Z* or *E*) for the following alkenes.

9. (12 pts.) Determine the stereochemical configuration (*R* or *S*) of the chiral C atoms in the following structures.

10. (12 pts.) Place a star next to the chirality centers in the following structures and circle the chiral molecules.




1 H 1.0079
2 He 4.0026
3 Li 6.941
4 Be 9.012
5 B 10.811
6 C 12.011
7 N 14.007
8 O 15.999
9 F 18.998
10 Ne 20.1797
11 Na 22.989
12 Mg 24.305
13 Al 26.981
14 Si 28.086
15 P 30.974
16 S 32.065
17 Cl 35.453
18 Ar 39.948
19 K
20 Ca
21 Sc
22 Ti
23 V
24 Cr
25 Mn
26 Fe
27 Co
28 Ni
29 Cu
30 Zn
31 Ga
32 Ge
33 As
34 Se
35 Br 79.904
36 Kr
37 Cs
38 Sr
39 Y
40 Zr
41 Nb
42 Mo
43 Tc
44 Ru
45 Rh
46 Pd
47 Ag
48 Cd
49 In
50 Sn
51 Sb
52 Te
53 I
54 Xe
55 Rb
56 Ba
57 La
72 Hf
73 Ta
74 W
75 Re
76 Os
77 Ir
78 Pt
79 Au
80 Hg
81 Tl
82 Pb
83 Bi
84 Po
85 At
86 Rn
87 Fr
88 Ra
89 Ac
104 Rf
105 Db
106 Sg
107 Bh
108 Hs
109 Mt
110
111
112
114
116
118
58 Ce
59 Pr
60 Nd
61 Pm
62 Sm
63 Eu
64 Gd
65 Tb
66 Dy
67 Ho
68 Er
69 Tm
70 Yb
71 Lu
90 Th
91 Pa
92 U
93 Np
94 Pu
95 Am
96 Cm
97 Bk
98 Cf
99 Es
100 Fm
101 Md
102 No
103 Lr