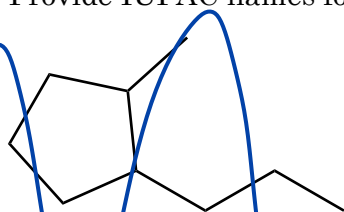
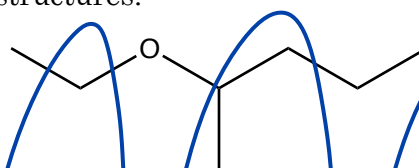


1. (6 pts. ea.) Provide IUPAC names for the following structures.

a.



b.



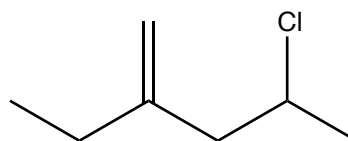
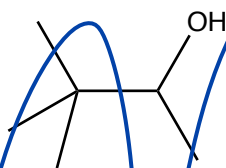
1. _____

2. _____

3. _____

4. _____

c.



5. _____

6. _____

7. _____

8. _____

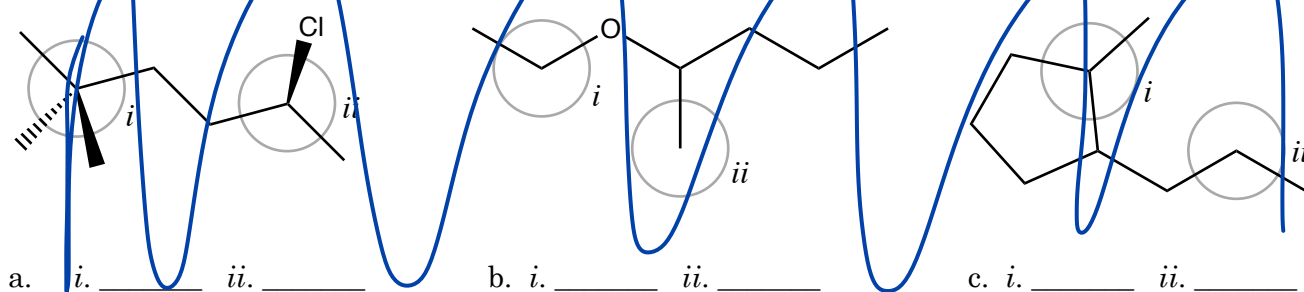
9. _____

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

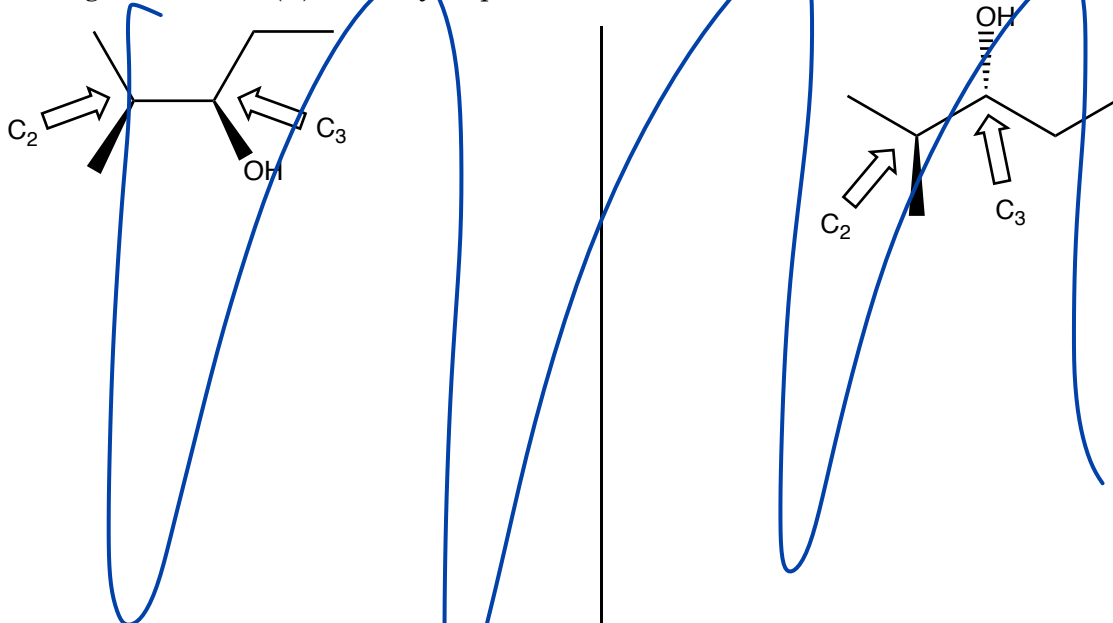
10. _____

3. (10 pts.) The dipole moment of CH_2Cl_2 (methylene chloride) is 1.6 D and the dipole moment of $\text{CH}_3\text{CH}_2\text{OCH}_2\text{CH}_3$ (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 .

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.

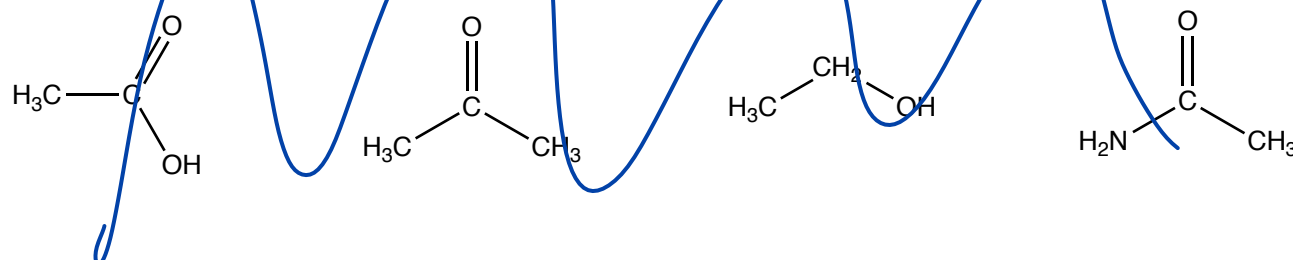


5. a. (12 pts.) Newman projections allow the viewer to visualize how groups attached to adjacent C atoms interact with each other. Draw the Newman projections along the C_2 to C_3 bond of the following rotamers of (*R*)-2-methyl-3-pentanol.

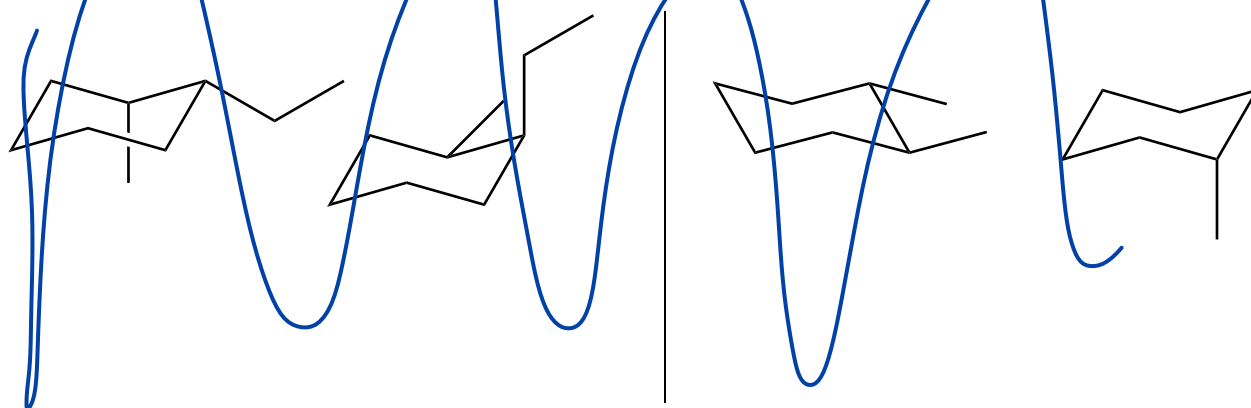


- b. (6 pts.) Which rotamer is lower in energy?

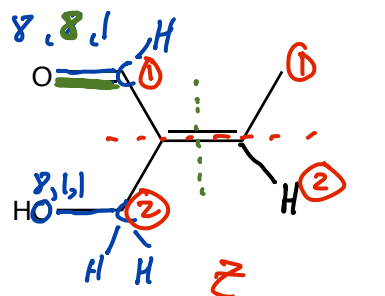
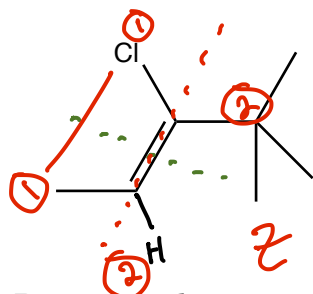
6. (12 pts.) Identify the function group on each of the following structures; be as specific as possible.



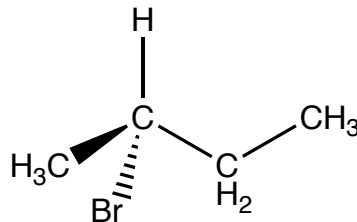
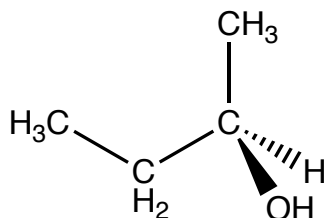
7. The single bonds in cyclic alkanes can partially rotate, and when all of the bonds in the ring partially rotate a ring flip results. **(a. 6 pts.)** For the following pairs of cyclohexane molecules determine whether the two structures represent the same but ring-flipped molecules and **(b. 6 pts.)**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



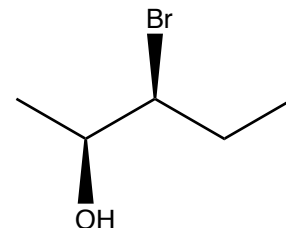
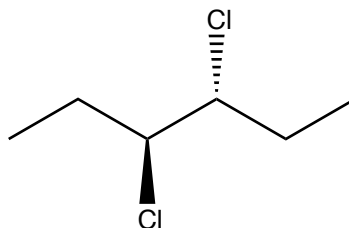
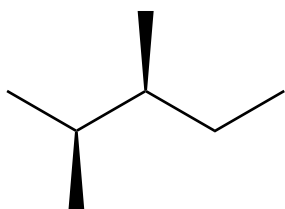
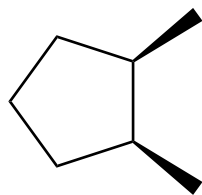
8. (12 pts.) Determine the stereochemical configurations (*Z* or *E*) for the following alkenes.



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
11	Na	22.989	12	Mg	24.305
19	K	39	20	Ca	40
37	Cs	55	38	Sr	56
55	Rb	72	56	Ba	73
87	Fr	88	89	Ra	89
21	Sc	22	23	Ti	24
39	Y	40	41	Zr	42
57	La	58	59	Ce	60
72	Hf	73	74	Ta	75
89	Ac	90	91	Th	92
104	Rf	105	106	Sg	107
108	Bh	109	110	Mt	111
112	Hs	113	114	Db	115
116	Uu	117	118	Uub	119
25	Mn	26	27	Co	28
43	Tc	44	45	Rh	46
75	Re	76	77	Ir	78
107	Bh	108	109	Hs	110
125	Uut	126	127	Uuh	128
133	Uuq	134	135	Uuq	136
151	Uup	152	153	Uup	154
169	Uuh	170	171	Uuh	172
187	Uus	188	189	Uus	190
205	Uuo	206	207	Uuo	208
223	Uu	224	225	Uu	226
241	Uu	242	243	Uu	244
259	Uu	260	261	Uu	262
277	Uu	278	279	Uu	280
295	Uu	296	297	Uu	298
313	Uu	314	315	Uu	316
331	Uu	332	333	Uu	334
349	Uu	350	351	Uu	352
367	Uu	368	369	Uu	370
385	Uu	386	387	Uu	388
403	Uu	404	405	Uu	406
421	Uu	422	423	Uu	424
439	Uu	440	441	Uu	442
457	Uu	458	459	Uu	460
475	Uu	476	477	Uu	478
493	Uu	494	495	Uu	496
511	Uu	512	513	Uu	514
529	Uu	530	531	Uu	532
547	Uu	548	549	Uu	550
565	Uu	566	567	Uu	568
583	Uu	584	585	Uu	586
601	Uu	602	603	Uu	604
619	Uu	620	621	Uu	622
637	Uu	638	639	Uu	640
655	Uu	656	657	Uu	658
673	Uu	674	675	Uu	676
691	Uu	692	693	Uu	694
709	Uu	710	711	Uu	712
727	Uu	728	729	Uu	730
745	Uu	746	747	Uu	748
763	Uu	764	765	Uu	766
781	Uu	782	783	Uu	784
799	Uu	800	801	Uu	802
817	Uu	818	819	Uu	820
835	Uu	836	837	Uu	838
853	Uu	854	855	Uu	856
871	Uu	872	873	Uu	874
889	Uu	890	891	Uu	892
907	Uu	908	909	Uu	910
925	Uu	926	927	Uu	928
943	Uu	944	945	Uu	946
961	Uu	962	963	Uu	964
979	Uu	980	981	Uu	982
997	Uu	998	999	Uu	1000

58	Ce	Pr	Nd	Pm	Sm	Eu	Gd	Tb	Dy	Ho	Er	Tm	Yb	Lu
90	Th	Pa	U	Np	Pu	Am	Cm	Bk	Cf	Es	Fm	Md	No	Lr