Chemistry 277
Practice Exam #1

Name: _____

ID#: _____

Clearly print your name in the space provided.

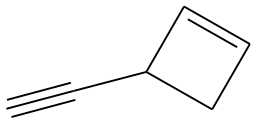
Clearly print your student ID number in the space provided.

Maintain appropriate security over your exam.

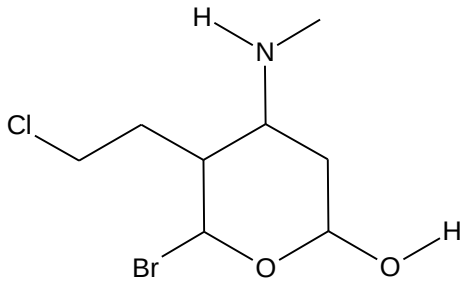
PERIODIC TABLE OF THE ELEMENTS

1A												3A	4A	5A	6A	7A	8A
1 **H** 1.01	2A																2 **He** 4.00
3 **Li** 6.94	4 **Be** 9.01											5 **B** 10.81	6 **C** 12.01	7 **N** 14.01	8 **O** 16.00	9 **F** 19.00	10 **Ne** 20.18
11 **Na** 22.99	12 **Mg** 24.31	3B	4B	5B	6B	7B	8B	8B	8B	1B	2B	13 **Al** 26.98	14 **Si** 28.09	15 **P** 30.97	16 **S** 32.07	17 **Cl** 35.45	18 **Ar** 39.95
19 **K** 39.10	20 **Ca** 40.08	21 **Sc** 44.96	22 **Ti** 47.88	23 **V** 50.94	24 **Cr** 52.00	25 **Mn** 54.94	26 **Fe** 55.85	27 **Co** 58.93	28 **Ni** 58.69	29 **Cu** 63.55	30 **Zn** 65.39	31 **Ga** 69.72	32 **Ge** 72.61	33 **As** 74.92	34 **Se** 78.96	35 **Br** 79.90	36 **Kr** 83.80
37 **Rb** 85.47	38 **Sr** 87.62	39 **Y** 88.91	40 **Zr** 91.22	41 **Nb** 92.91	42 **Mo** 95.94	43 **Tc** (98)	44 **Ru** 101.07	45 **Rh** 102.91	46 **Pd** 106.42	47 **Ag** 107.87	48 **Cd** 112.41	49 **In** 114.82	50 **Sn** 118.71	51 **Sb** 121.76	52 **Te** 127.60	53 **I** 126.90	54 **Xe** 131.3
55 **Cs** 132.91	56 **Ba** 137.33	57 **La** 138.91	72 **Hf** 178.49	73 **Ta** 180.95	74 **W** 183.85	75 **Re** 186.21	76 **Os** 190.2	77 **Ir** 192.22	78 **Pt** 195.08	79 **Au** 196.97	80 **Hg** 200.59	81 **Tl** 204.38	82 **Pb** 207.19	83 **Bi** 208.98	84 **Po** (209)	85 **At** (210)	86 **Rn** (222)
87 **Fr** (223)	88 **Ra** 226.03	89 **Ac** (227)	104	105	106	107	108	109									

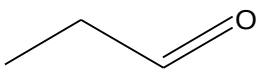
1. In the molecule below, determine the number of pi bonds and sigma bonds.

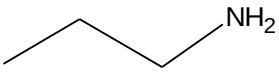


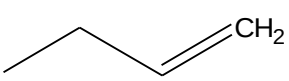
2. How many lone pairs of electrons would there be in the following molecule?
3.



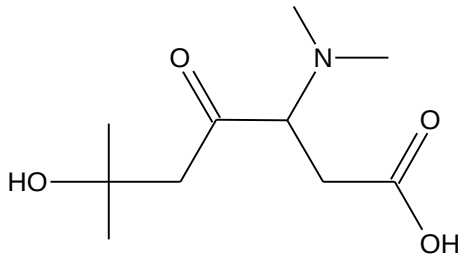
4. Which of the following compounds is most soluble in water? Which is least? Explain your answers in detail.





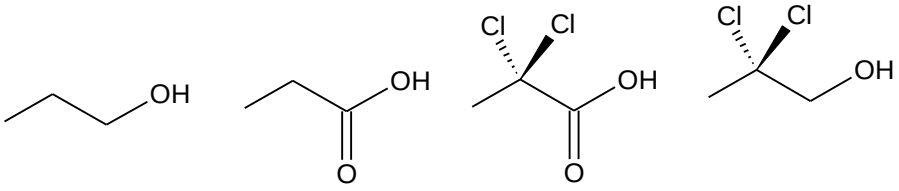


5. Circle and identify the functional groups in the following molecule. When appropriate, determine if functional group is primary, secondary or tertiary.



6. Draw all the resonance structures of SCN^{-1}. Identify the major and minor contributors. Explain your reasoning in detail. The electronegativites are as follows: sulfur = 2.58; carbon = 2.55; nitrogen = 3.04, fluorine = 3.98

7. Arrange the following molecules from the least to most acidic.



8. Draw all the following compounds.

a) *trans*-1,3-dimethyl cyclononane

b) 3,7-dicyclopropyl-2,4,6,8-tetramethyl undecane

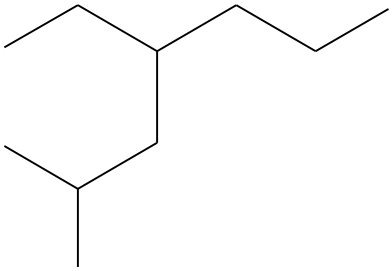
c) isopentyl cyclohexane

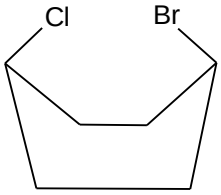
d) 5-(1,1,2-trimethyl propyl) decane

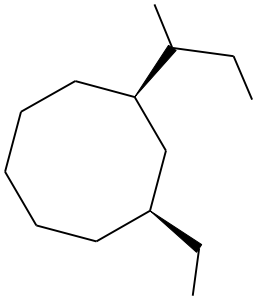
e) 5-*tert*-butyl-3-methyl octane

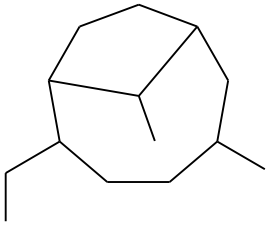
f) dichloroiodomethane

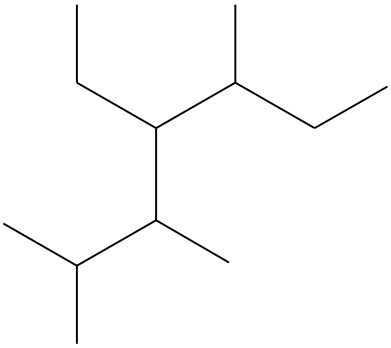
9. Name the following organic compounds.

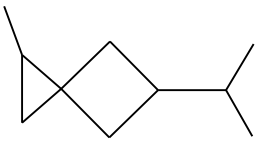






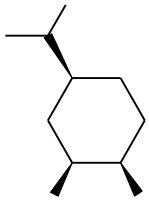






10. Draw all possible constitutional isomers of $C_4H_8Br_2$.

11. Draw the molecule below in the lowest energy state using the appropriate boat or chair conformer.



12. Draw the Newman projection, looking down the carbon-carbon bond, of the highest and lowest energy state conformers of the following molecule.