

CHM 2120
Midterm #1
September 29, 2010

First Name: _____ Last Name: _____

Student Number: _____

Seat number: _____

Approximate total number of marks: 72

The marks are given as a guide and are subject to change.

You can write in pen or in pencil.

The use of molecular models is permitted but they cannot be shared.

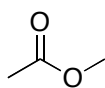
The use of calculators or other electronic devices is not permitted.

1a	2a	3b	4b	5b	6b	7b	8	1b	2b	3a	4a	5a	6a	7a	0		
1 H															2 He		
3 Li	4 Be										5 B	6 C	7 N	8 O	9 F	10 Ne	
11 Na	12 Mg										13 Al	14 Si	15 P	16 S	17 Cl	18 Ar	
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	36 Kr
37 Rb	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 Cs	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 Ha	106 106												

1. Draw the structure of (2*S*,3*R*,*Z*)-2-aminonon-7-en-3-ol. **(3 points)**

2.

- Draw all of the resonance structures of the following compound using arrows to show the movement of electrons. **(4 points)**
- Rank the resonance structures. **(2 points)**
- Justify your ranking. **(5 points)**
- Draw the resonance hybrid structure. **(2 points)**

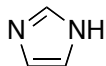


3.

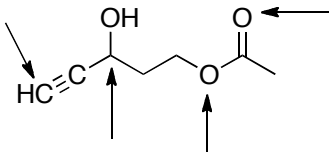
- Draw the mechanism and products for the following reaction. **(5 points)**
- Will the reaction favour the starting materials or the products? **(1 point)**
- Justify your choice in part b. **(3 points)**



4. Circle the most basic nitrogen atom in the following compound and justify your choice. (3 points)



5. Identify the hybridization state for each of the atoms indicated with an arrow. (4 points)

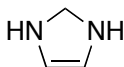


6. Decide whether each of the following compounds is aromatic, anti-aromatic, or non-aromatic and justify your choice (please support your answer with a drawing if you are discussing the position of electrons or orbitals in space). (11 points)

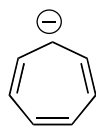
a.



b.

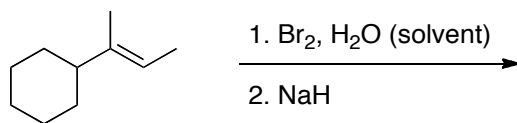


c.

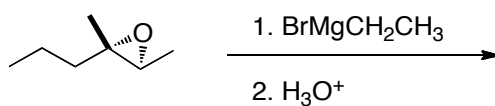


7. Provide a mechanism and the major organic product of each of the following reactions. (4 points each = 12 points)

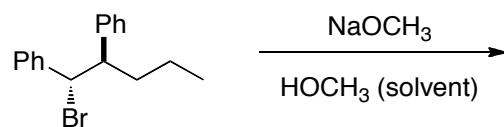
a.



b.

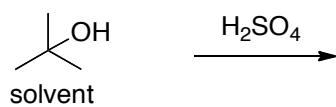


c. Please include a Newman projection of the reactive conformation.

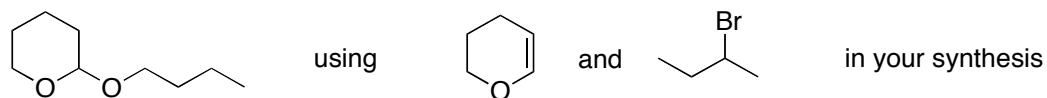


8.

- Draw the two products of the following reaction. **(2 points)**
- Circle the major product. **(1 point)**

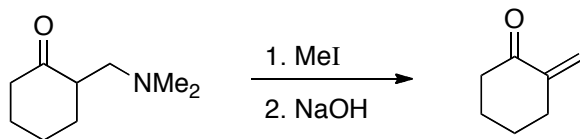


9. Propose a synthesis of:

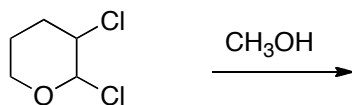


You can add in any other reagents that you require. You do not have to provide a retrosynthesis. **(6 points)**

10. Draw a mechanism for the following reaction: (4 points)



11. Draw a mechanism showing the formation of the major product of the following reaction: (4 points)



Bonus! (3 points)

Explain the following results. Please draw a mechanism in 3D as part of your answer.

