

scores:

- 1)
- 2)
- 3)
- 4)

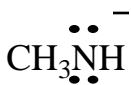
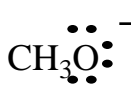
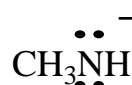

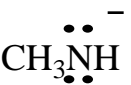
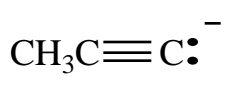



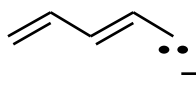
This is a closed-book "open model" exam. You may use models, but no notes or books. Please put all your answers on the test. Use the backs of the pages for scratch. There are additional scratch sheets at the end of the exam.

PLEASE read the questions carefully!

Partial Periodic Table

		1 H						8A 2 He
1A	2A	3A	4A	5A	6A	7A		
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	
						35 Br		
						53 I		

1) (24 pts) a) For each of the following pairs of structures, circle the weaker base.

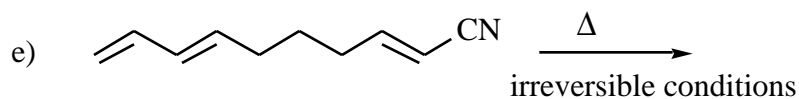
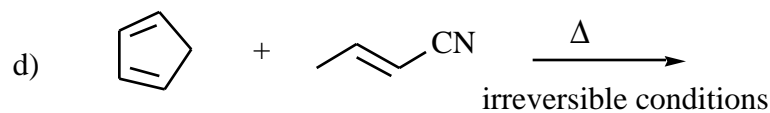
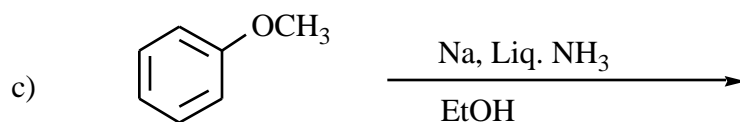
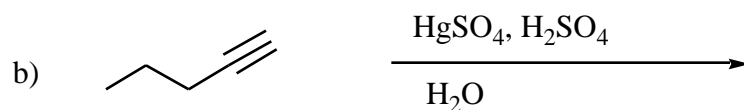
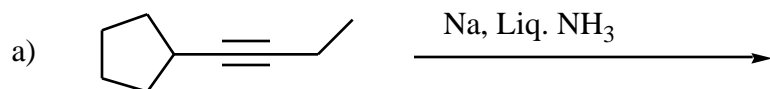
A  	B  
C  	D  
E   1 2 Please note: for structures 1 and 2 the H atoms are not shown, but they are present.	

b) Give a one sentence explanation for your answer to part A above.

c) Give a one sentence explanation for your answer to part C above.

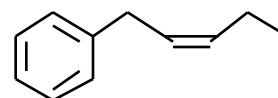
d) Give a one sentence explanation for your answer to part E above.

2) (25 pts) Give the single major organic product for each of the following reactions. Following the standard convention, if a racemate is formed, consider this to be one product and show only one of the enantiomers. Carefully show the stereochemistry of the product using wedges and dashes or perspective drawings if appropriate.

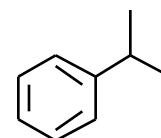


3) (24 pts) Propose reagents for accomplishing the following transformations.
NOTE: more than one step may be required! Try to make your synthesis efficient (i.e. the desired product should be the major product). You must use the starting material given, and you may use any other organic or inorganic reagent you want.

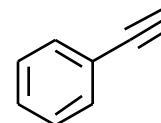
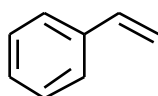
a) $\text{HC}\equiv\text{CH}$



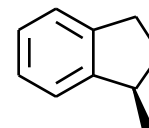
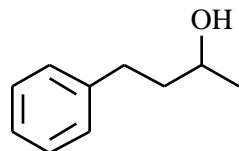
b)



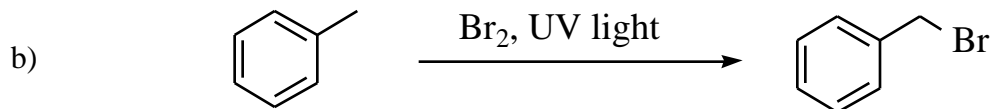
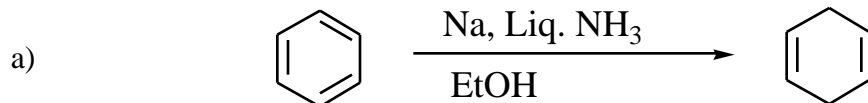
c)



d)

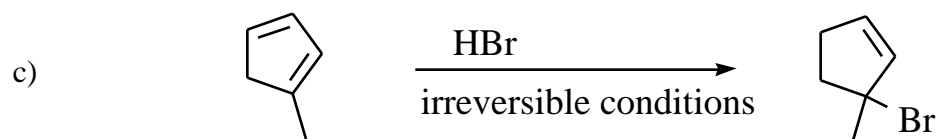


4) (27 pts) Propose an arrow pushing mechanism for each of the following transformations. Carefully show the structure of each intermediate in your mechanism (for this question please show one valence bond structure for each intermediate even if the actual molecules is a resonance hybrid of several important contributors).



For this question, only show the chain propagation steps (yes, this is a hint).

4) - continued -



d) Draw the two other most important resonance contributors to the structure of the following anion and circle the major contributor.



e) Why is the circled structure the major contributor in part d).