

Student ID \_\_\_\_\_

Name \_\_\_\_\_

Recitation Date/Time \_\_\_\_\_ TA Name \_\_\_\_\_

page points:

2 \_\_\_\_\_ (26)

3 \_\_\_\_\_ (25)

4 \_\_\_\_\_ (25)

5 \_\_\_\_\_ (16)

6 \_\_\_\_\_ (8)

Total \_\_\_\_\_ (100)

## Periodic Table

H																	He
Li	Be											B	C	N	O	F	Ne
Na	Mg											Al	Si	P	S	Cl	Ar
K	Ca	Sc	Ti	V	Cr	Mn	Fe	Co	Ni	Cu	Zn	Ga	Ge	As	Se	Br	Kr
Rb	Sr	Y	Zr	Nb	Mo	Tc	Ru	Rh	Pd	Ag	Cd	In	Sn	Sb	Te	I	Xe
Cs	Ba	La	Ha	Ta	W	Re	Os	Ir	Pt	Au	Hg	Tl	Pb	Bi	Po	At	Rn
Fr	Ra	Ac															

**Please sit with an empty seat between you and your neighbors.**

**Please silence your cell phones and keep them in your bags during exam.**

**You may use molecular models. Please bring them in transparent bags.**

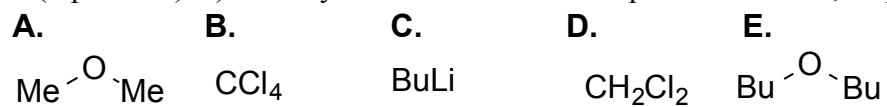
**Feel free to ask questions about the questions, but please don't ask questions about your answers, it distracts your neighbors.**

1. Provide the structure for each of the following compounds. (4 pts each)

a) R-3-fluorobutyl benzyl ether

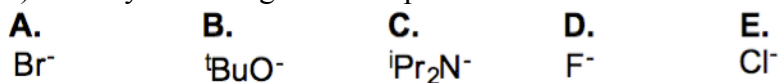
b) 3-Isopropyl-1-tert-butyl-cycloheptane

2. (3 pts each) a) Identify the most and the least polar molecules, respectively.



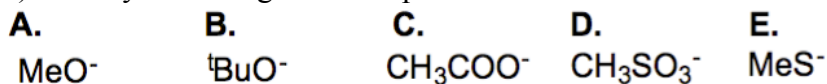
Most polar: \_\_\_\_\_; Least polar: \_\_\_\_\_.

b) Identify the strongest nucleophile.



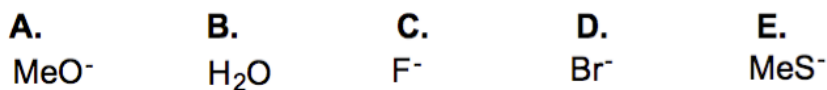
Strongest nucleophile: \_\_\_\_\_.

c) Identify the strongest nucleophile.



Strongest nucleophile: \_\_\_\_\_.

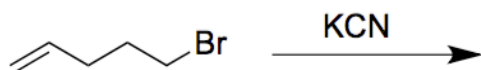
d) Identify the best and worst leaving groups, respectively.



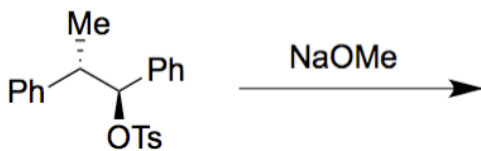
Best leaving group: \_\_\_\_\_; worst leaving group: \_\_\_\_\_.

3. Provide the major product(s) for each of the following reactions (4 pts each).

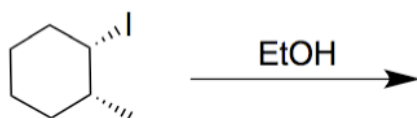
a)



b)



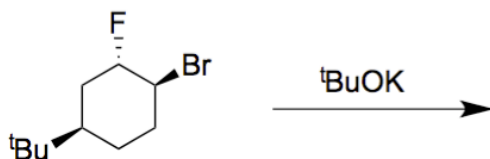
c)



d)

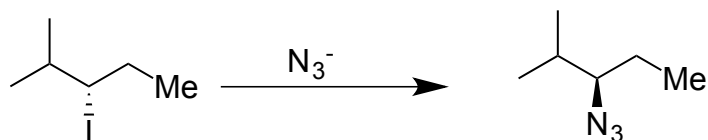


e)

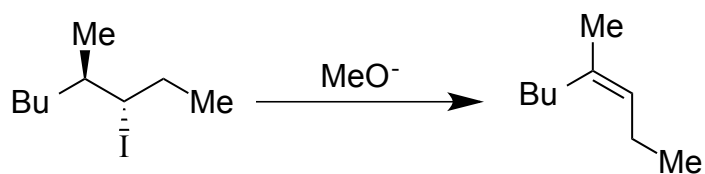


4. Draw the transition state for each of the following reactions (5 pts each).

a)



b)



5. Provide the best reaction conditions for each of the following transformations (4 pts each)

a)



b)



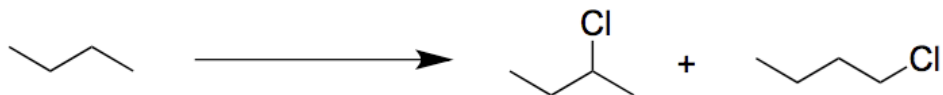
c)



d)

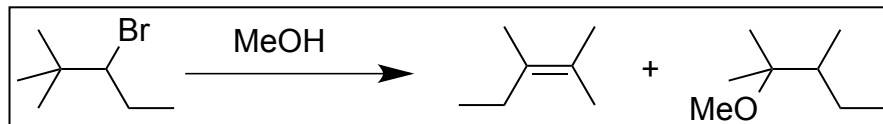


e)

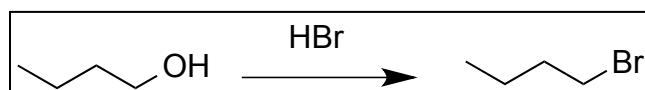


6. Use curved arrow or fishhook notation to draw the mechanism for each of the following reactions. **Do NOT draw in the box.**

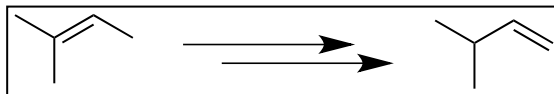
a) 10 pts



b) 6pts



7. Propose a reasonable synthetic route for each of the following transformations. The reagents and products are required for each step (8 pts). **Do NOT draw in the box.**



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