CHEM 3331 (Richardson) Midterm Exam 2 – Oct. 22, 2024

Your Name: _____

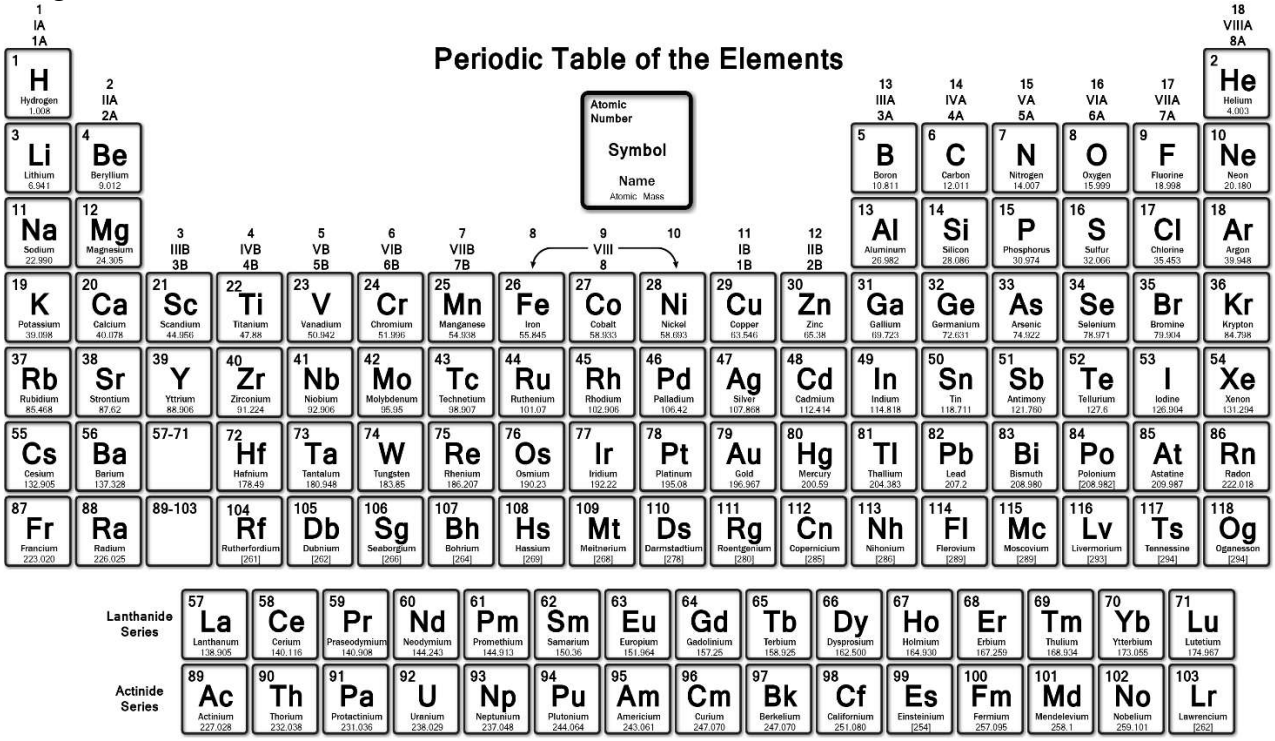
Student ID: _____

Recitation TA (fill in one circle):

O 134 (Phil Pham)
O 135 (Phil Pham)
O 136 (Max Abreu)
O 137 (Max Abreu)
O 141 (Phil Pham)
O 142 (Phil Pham)
O 143 (Zhehao Yuan)
O 144 (Tania Shahvali)
O 147 (Tania Shahvali)

Question	Score	Out of
1		30
2		20
3		20
4		30
5		10 e.c.
Total		100

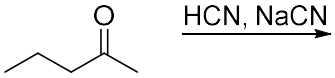
This is a closed-book exam, except for one double-sided sheet of 8.5 x 11" paper. The use of calculators or cell phones will not be allowed during the exam. You may use models sets brought in a clear bag. Use the backs of the pages for scratch work. If your final answer is not clearly specified, you will lose points. For mechanisms, show all intermediates including correct formal charges, but do not show transition states.

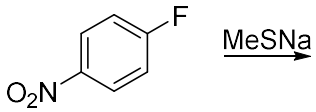


pKa Values

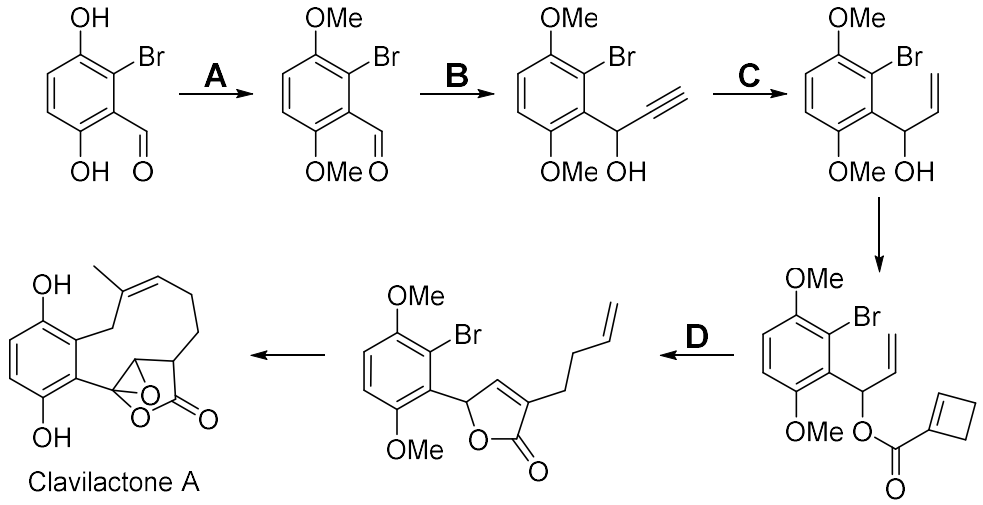
HI	-10	CH_3COOH	4.7	ArOH	10	HC≡CH	26
HBr	-8	HN_3	4.7	RSH	10-12	H_2	35
HCl	-6	H_2S	7.0	H_2O	15.7	NH_3	36
H_3O^+	-1.7	NH_4^+	9.3	ROH	16-18	$H_2C{=}CH_2$	45
HF	3.2	HCN	9.4	O=C-CH	9-25	CH_4	60

1) Show the products of these reactions and the mechanism for their formation. Show all major resonance forms of any intermediates. (30 pts).

a. 

b. 

2) Clavilactone A is a compound with interesting antifungal and antibacterial properties. It was synthesized by the following route. List the reagents that would be needed for each lettered step. (20 pts)



A:

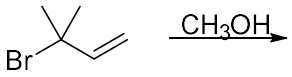
B:

C:

D:

3) When 3-bromo-3-methyl-1-butene is dissolved in methanol, a reactive intermediate is formed which results in two products. (20 pts)

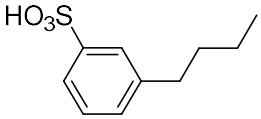
a. Give the two major resonance contributors to the structure of this intermediate. (10 pts)



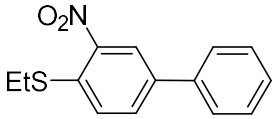
b. Draw the structures of the two major products for this reaction. (10 pts)

4) Find a way to synthesize the desired product from any reagents containing at most six carbon atoms, or triphenylphosphine, or any transition metal catalyst. (30 pts)

a.



b.



5) Extra credit! Show the mechanism and final products for this reaction. (10 pts e.c.)