



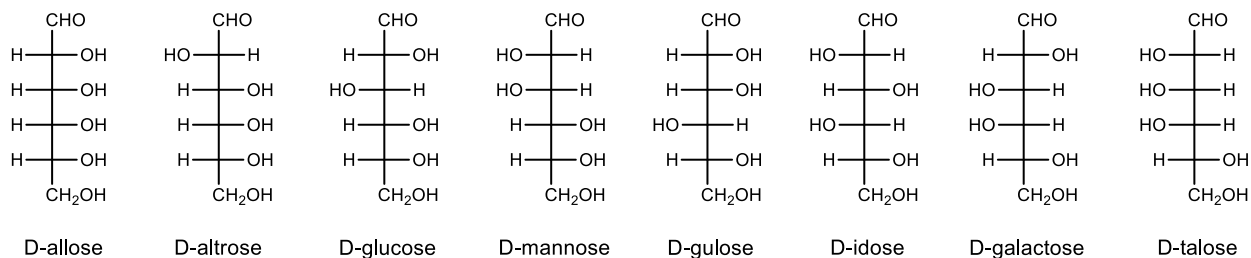
# CHE 322 Organic Chemistry II

Exam 3 Form 1

Thursday April 28, 2022

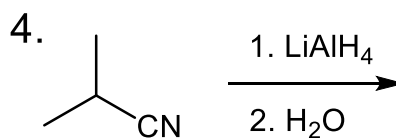
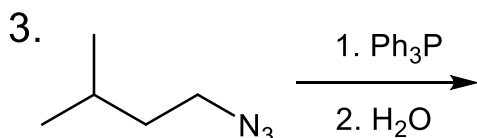
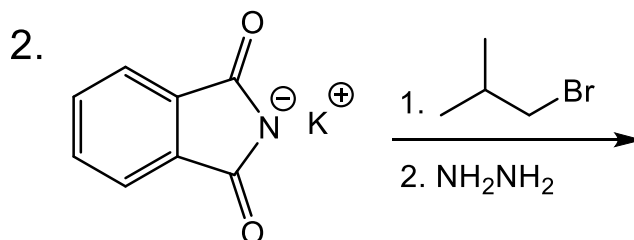
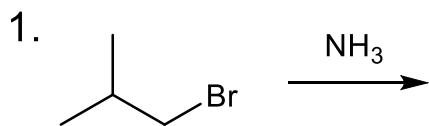
8:15 PM – 9:35 PM

- Write your nine digit University ID number in the nine boxes provided and then bubble in each of the nine digits.
- Print your name and sign your answer form using the spaces provided.
- Questions 1 to 10 are multiple choice questions worth 5 points. Bubble your answers on the answer form. Questions 11-17 are short answer questions with points as indicated. Write out your answers in the indicated place on the answer form.



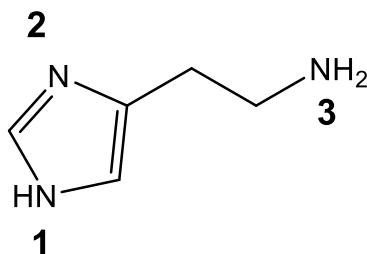
		Group																	
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
Period	1	H																	He
	2	Li	Be											B	C	N	O	F	Ne
	3	Na	Mg											Al	Si	P	S	Cl	Ar
	4	K	Ca	Sc	Ti	V	Cr	Mn	Fe	Co	Ni	Cu	Zn	Ga	Ge	As	Se	Br	Kr
	5	Rb	Sr	Y	Zr	Nb	Mo	Tc	Ru	Rh	Pd	Ag	Cd	In	Sn	Sb	Te	I	Xe
	6	Cs	Ba		Hf	Ta	W	Re	Os	Ir	Pt	Au	Hg	Tl	Pb	Bi	Po	At	Rn
	7	Fr	Ra		Rf	Db	Sg	Bh	Hs	Mt	Ds	Rg	Cn	Nh	Fl	Mc	Lv	Ts	Og

1. Which reactions will give the same major product?



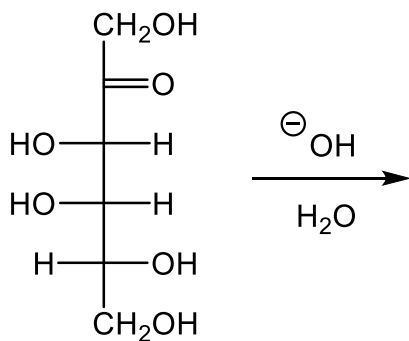
- A. 1 and 2    B. 1 and 3    C. 1 and 4    D. 2 and 3    E. 2 and 4    F. 3 and 4

2. Histamine (shown below) is an important hormone within the body. It has 3 amines with different basicity. Rank the amines from least to most basic.



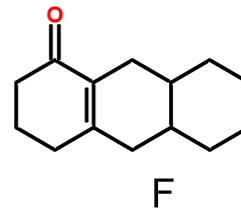
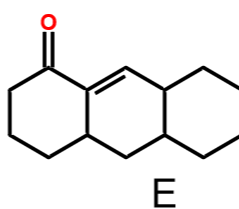
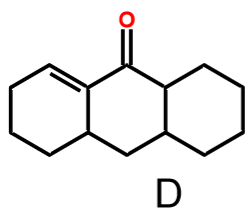
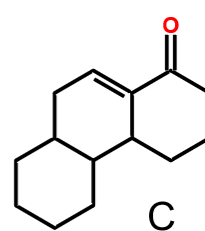
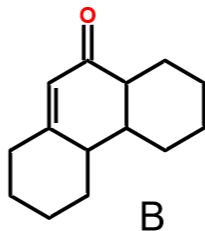
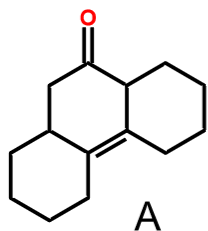
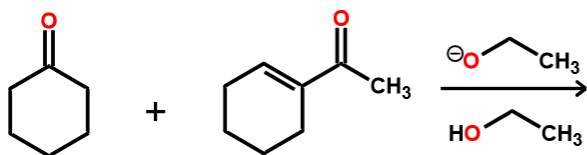
- A. 1 < 2 < 3    B. 1 < 3 < 2    C. 2 < 1 < 3    D. 2 < 3 < 1    E. 3 < 1 < 2    F. 3 < 2 < 1

3. Select the two possible aldohexoses from base-catalyzed isomerization of the following ketose.

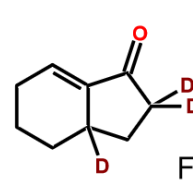
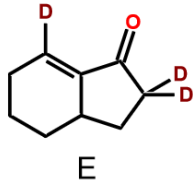
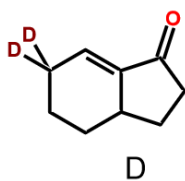
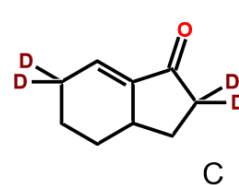
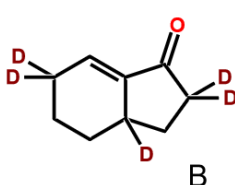
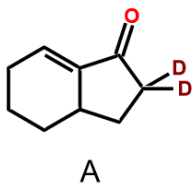
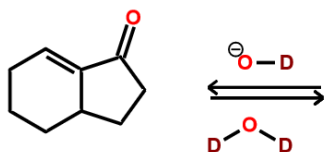


- A. D-allose & D-altrose    B. D-galactose & D-allose    C. D-mannose & D-talose  
D. D-galactose & D-talose    E. D-idose & D-mannose    F. D-gulose & D-idose

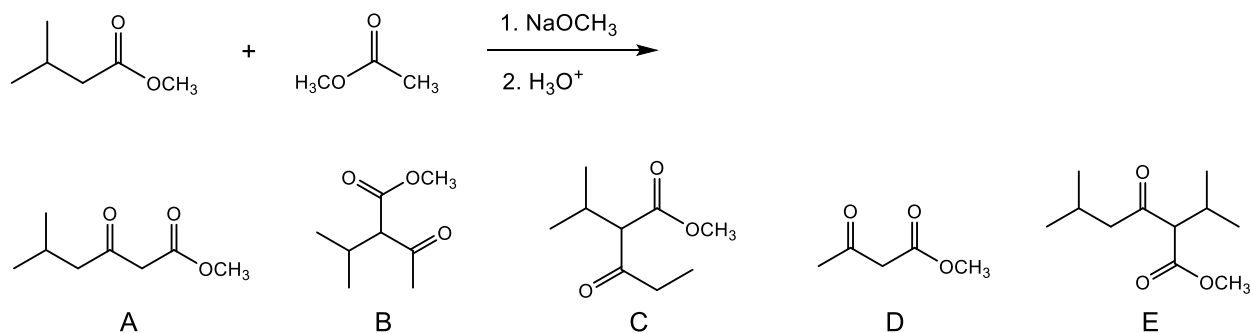
4. Choose the major product of the following Robinson Annulation.



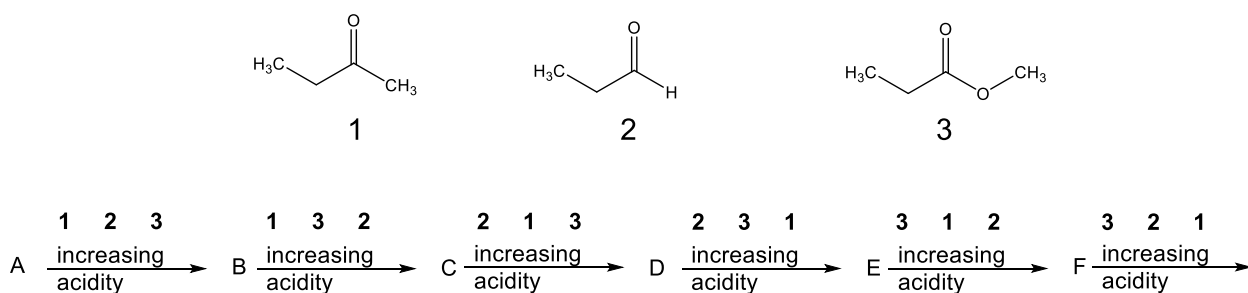
5. Predict the major product of the following deuterium exchange reaction.



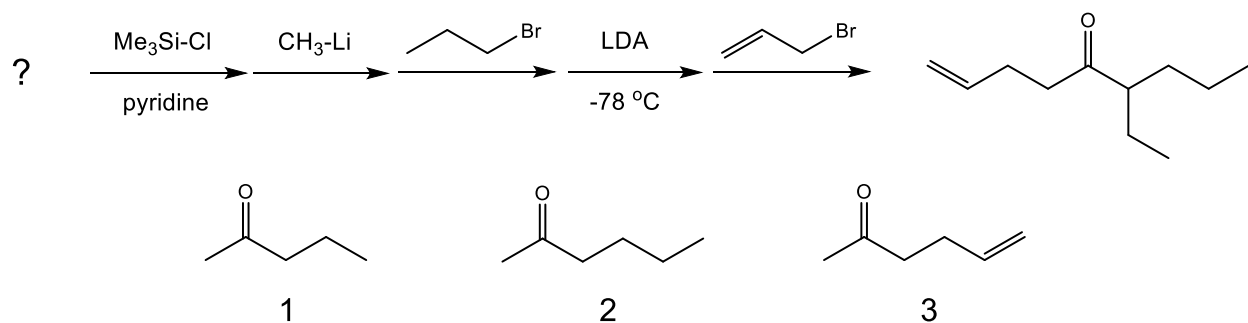
6. Choose the structure that would not be one of the possible products of the following crossed Claisen condensation reaction.



7. Rank the following compounds in order of increasing acidity.

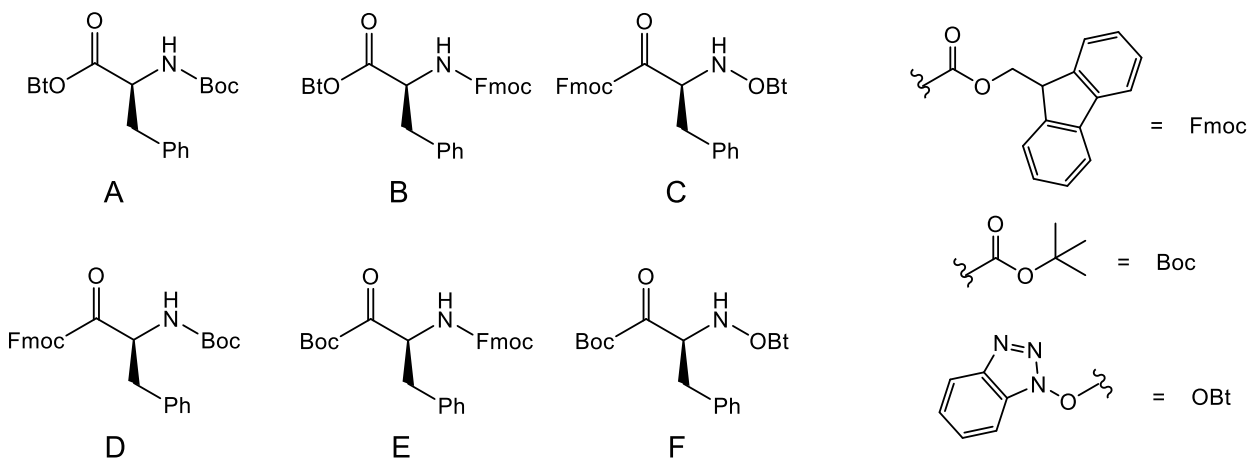
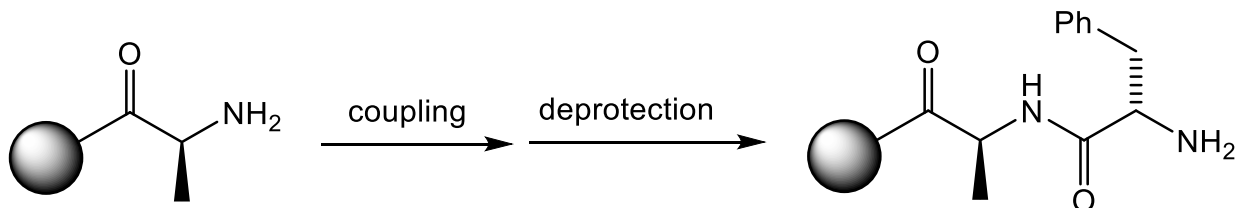


8. Which reactant can be used to complete the following reaction sequence and give the product shown as the major one?

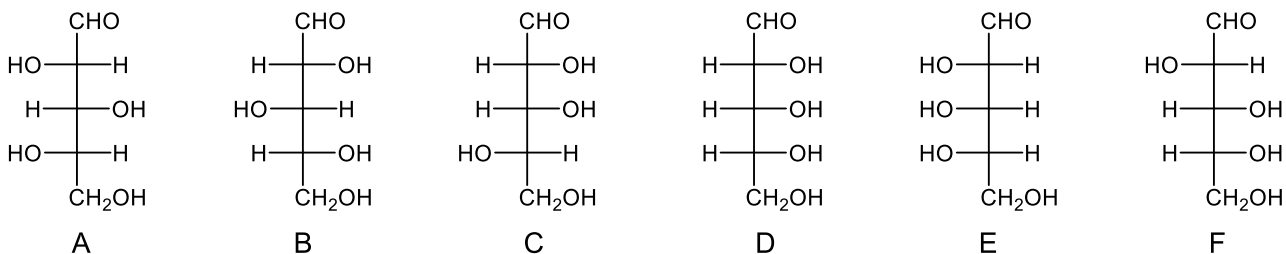
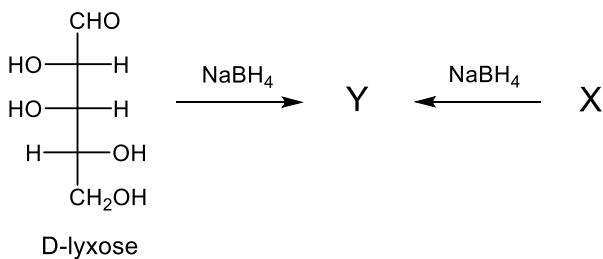


- A. 1 only     B. 2 only     C. 3 only     D. 1 or 2     E. 1 or 3     F. 2 or 3

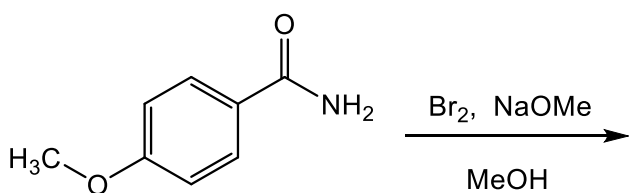
9. The following is part of a solid-phase peptide synthesis. Choose the correct reagent for the coupling step to add phenylalanine to the chain.



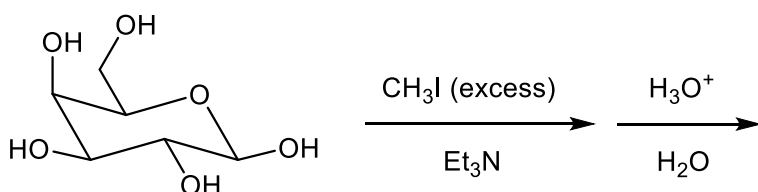
10. D-lyxose reacts with  $\text{NaBH}_4$  to give an alditol (**Y**). Choose the correct structure for compound **X**, an aldopentose that will give the same alditol (**Y**) when treated with  $\text{NaBH}_4$ .



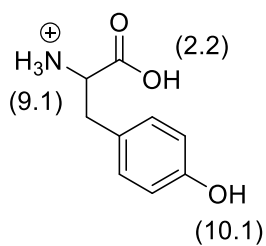
11. Provide a product for the following Hofmann rearrangement. (5 points)



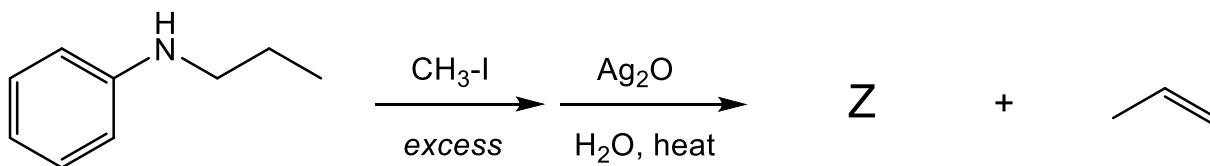
12. Draw the product of the following reaction sequence in its acyclic form. Use the template provided on your scantron to draw the Fischer projection. (5 points)



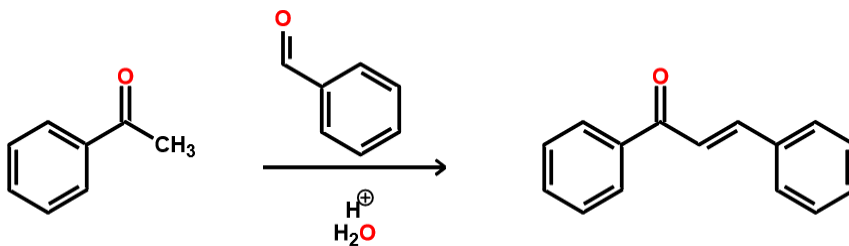
13. The structure below is the amino acid tyrosine as it exists in highly acidic solution. The  $\text{pK}_a$  value of each acidic group is given in parenthesis. Draw the most predominant form of tyrosine in a solution of  $\text{pH} = 7$ . (5 points)



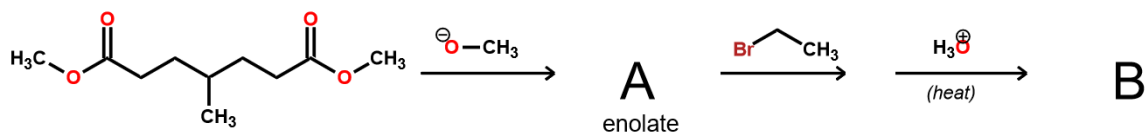
14. Draw the structure of compound **Z** formed from the following Hofmann elimination. (5 points)



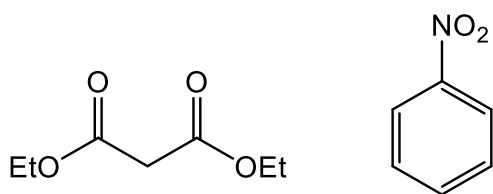
15. Draw a curved arrow mechanism for the acid catalyzed crossed aldol condensation shown below. Hint: You are in acid. Your mechanism should not include any anions!! (10 points)



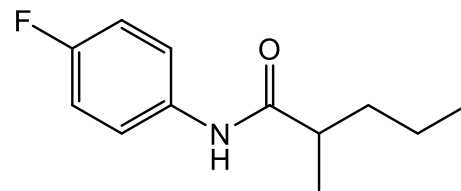
16. When the compound shown below is treated with methoxide base, it undergoes a cyclization to form enolate **A**. Enolate **A** is alkylated and then heated in aqueous acid. Draw the structures of enolate **A** and the final product **B**. (10 points)



17. Starting with diethyl malonate and nitrobenzene, prepare the compound shown below. You may use any other reagents/reactants. HINT: use diazonium chemistry with one of the starting materials and a malonic acid ester synthesis with the other starting material. (10 points)



starting materials



target compound



