CHEM 2324 Exam 3 ***Version A*** Name:

April 23, 2019 UTEP ID #:

If required, the Exam 3 retake homework will be due Friday, April 26, before 5 pm through <http://organic.utep.edu/quiz>, no exceptions or excuses. Put your name on these sheets so that you can recover your class answers. Expect an email from me this evening.

1.-5. Match the following reagents and conditions to a major product on the right. Exact match.

1. ethanal + acid or base catalysis a. 
2. ethanal + water, acid or base catalysis b. 
3. ethanal + methanol, base catalysis c. 
4. ethanal + excess methanol, acid catalysis d. 
5. ethanal + methanol, acid catalysis and heat e. 

6.-10. Match each structure to a best functional group type name. Answers may be repeated.

1.  ­ a. acetal
2.  b. enol
3.  c. enol ether
4.  d. hemiacetal
5.  e. hydrate

11.-13. Match the following reagents to a major product below. Charges are not shown. Answers may be repeated.

1.  + CH3NH2 12. + CH3NH2 + CF3CO2H 13. + CH3NH2 + CF3CO2H + NaBH3CN

a.  b.  c.  d.  e. 

14.-18. Match each structure to a best functional group type name. Answers may be repeated.

1.  ­ a. amine
2.  b. enamine
3.  c. hemiaminal
4.  d. imine
5.  e. iminium
6. What is the major product of the reaction of CH3Br, Ph3P, , 2-methylpropanal?

a.  b.  c.  d.  e. not a.-d.

20.-24. Match the following reagents to a product to the right. Answers may be repeated.

1. propanoic acid + propan-1-ol, acid catalysis a. 
2. propanoic acid + heat, acid catalysis b. 
3. propyl propanoate + sodium hydroxide c. 
4. propanoic anhydride + water d. 
5. propanoyl chloride + sodium propanoate e. not a.-d.
6. Which of the above reactions is referred to as a saponification related to how soap is made?

a. question 20. b. question 21. c. question 22. d. question 23. e. question 24.

26.-30. Match the following series of reactions (steps separated by commas) to a product on the right. Do the reactions in parentheses first. Assume any necessary workup. Answers may be repeated.

1. ethanoyl chloride + ethanol, 2 (CH3Br + Mg) a. 

1. ethanoic acid + NH4 + DCC, ((CH3)2CHCH2)2AlH, (CH3CH2Br + Mg) b. 
2. propyl propanoate + NH4, LiAlH4 c. 
3. propanamide + SOCl2 + heat, (CH3Br + 2 Li), NaBH4 d. 
4. 2-methylpropanoic acid + SOCl2 + pyridine catalysis, LiAlH4 e. not a.-d.
5. Which is the second intermediate (not reactants or products) of the reaction of ethanoic acid, NH4, and dicyclohexylcarbodiimide? Only neutral structures are shown. R = cyclohexyl

a.  b.  c.  d.  e. 

***Do not forget to put your name, ID, and version letter (A or B) on your scantron; and your name and ID on your exam sheets. Show a picture ID as you turn in you turn everything in.***