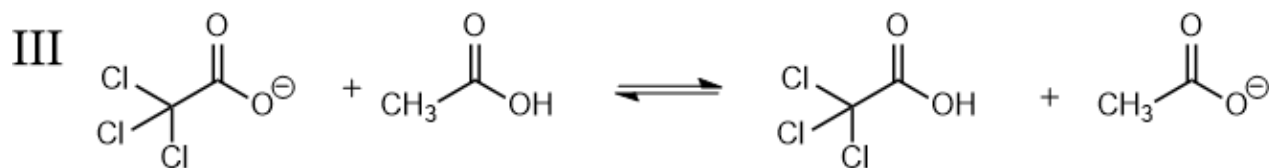
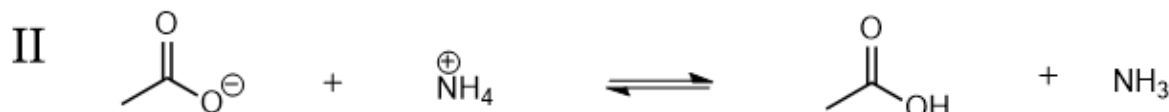
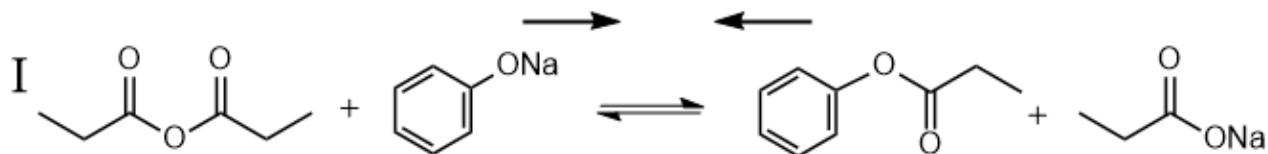
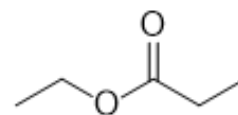
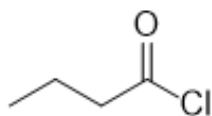
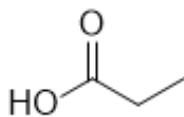




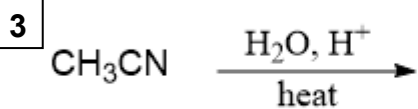
1 For each, predict whether the forward or reverse reaction is favored. Explain.



2 Provide the correct IUPAC name for each compound.

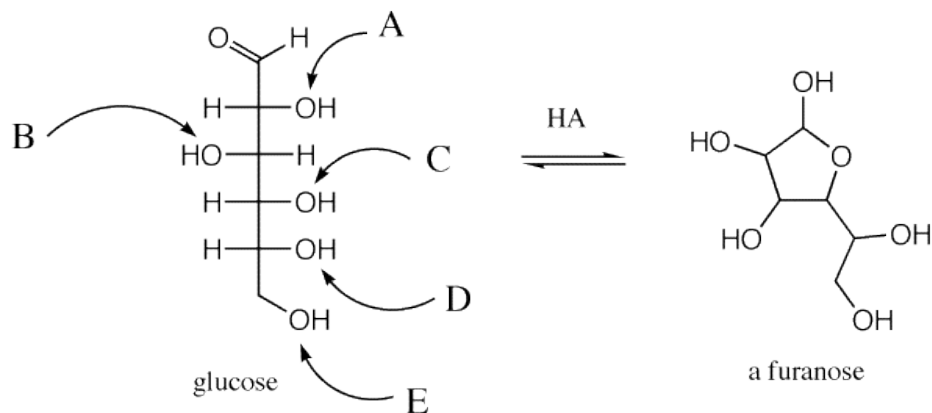


Predict the major product, and provide a mechanism.

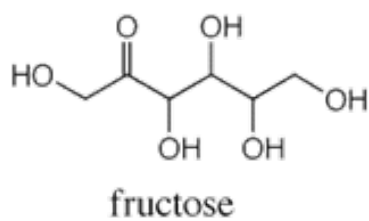


- A) Formic acid
- B) *N,N*-Dimethylformamide
- C) Acetic acid
- D) Hydroxyacetone
- E) Acetamide

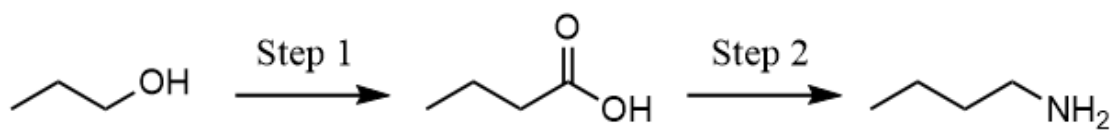
- 4 Which of the oxygen in glucose was involved in the cyclization to the furanose form shown?



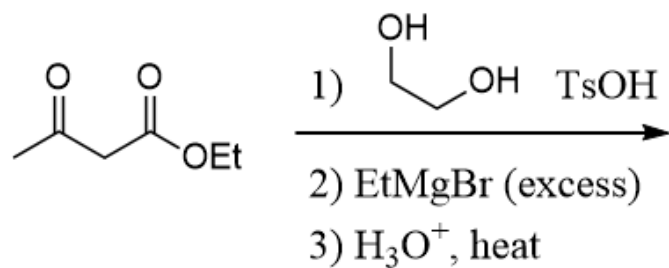
- 5 Which of the following structures represents a cyclic form of fructose? (6-membered ring)



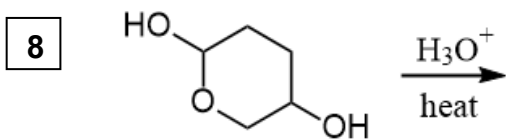
- 6 Provide the necessary reagents.



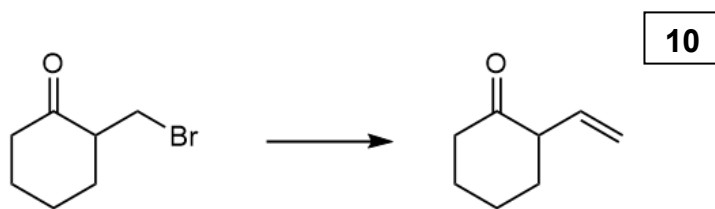
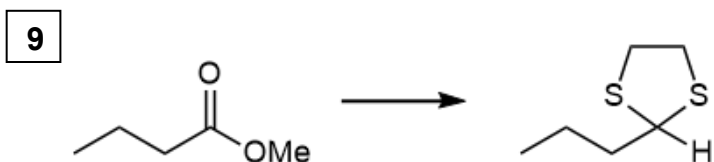
7



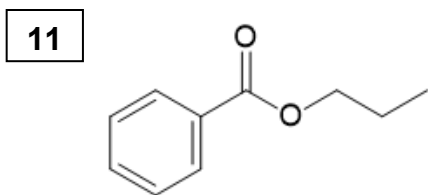
Predict the major product for the following reaction.



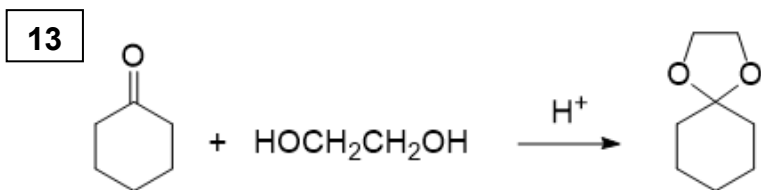
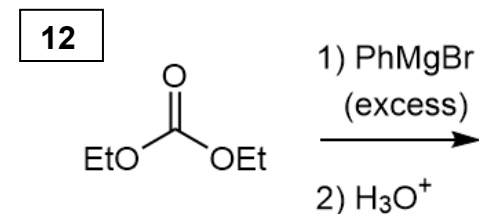
Provide the necessary reagents.



According to IUPAC rules, what is the name of the molecule shown?



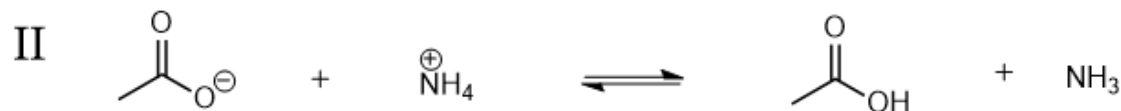
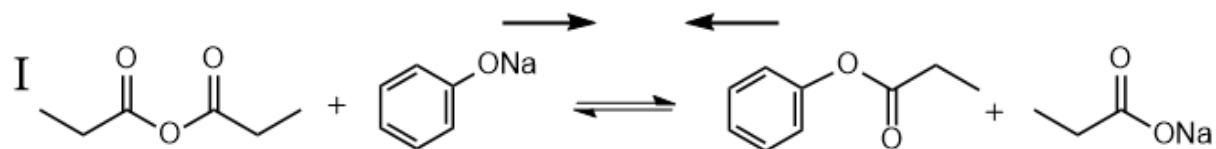
Predict the major product.



What is the hemiacetal intermediate in the reaction shown above?

1

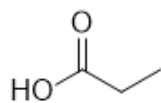
For each, predict whether the forward or reverse reaction is favored. Explain.



	A	B	C	D	E
I	→	→	←	←	neither
II	←	→	→	←	→
III	←	→	←	→	←

2

Provide the correct IUPAC name for each compound.



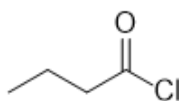
A) 1-oxo-1-propanol

B) propanic acid

C) propanoic acid

D) propanic acid

E) propanoic acid



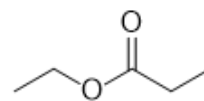
1-chlorobutanal

butanyl chloride

butanyl chloride

butanoyl chloride

butanoyl chloride



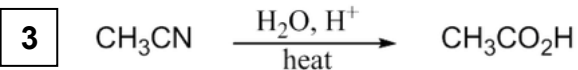
1-ethoxypropanone

propyl ethanoate

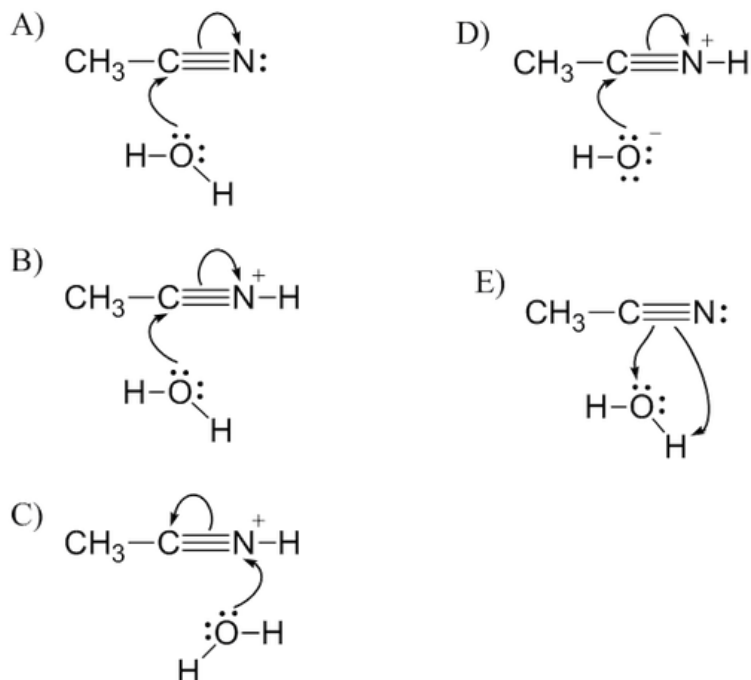
ethyl propanoate

propyl ethanoate

ethyl propanoate

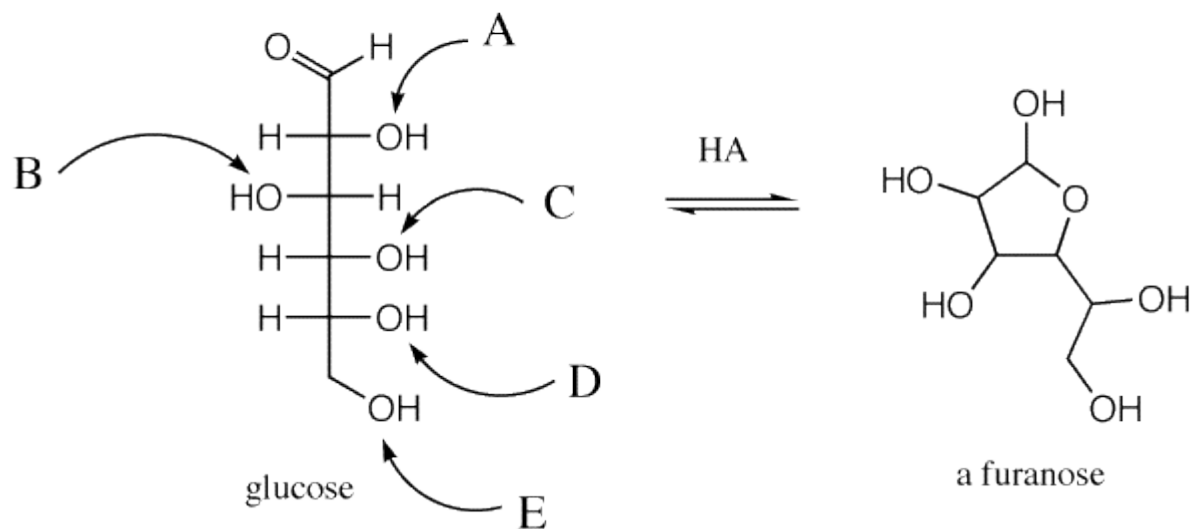


Which of the following best depicts the initial nucleophilic addition step in the acid-catalyzed hydrolysis of acetonitrile shown above?



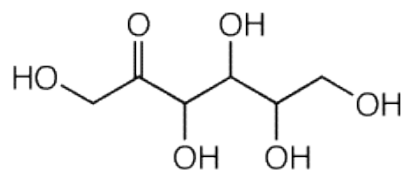
4

Which of the oxygen in glucose was involved in the cyclization to the furanose form shown?



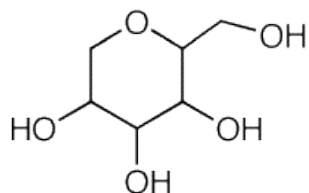
Which of the following structures represents a cyclic form of fructose?

5

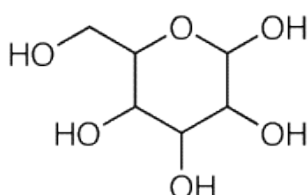


fructose

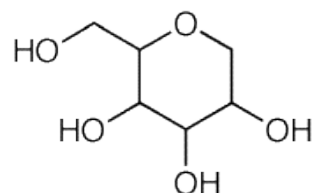
A)



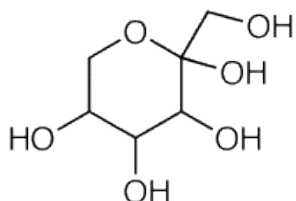
B)



C)

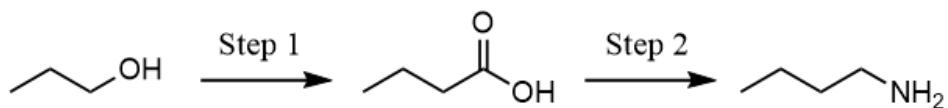


D)



E) None of the above

6



Step 1

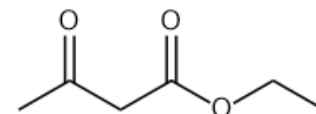
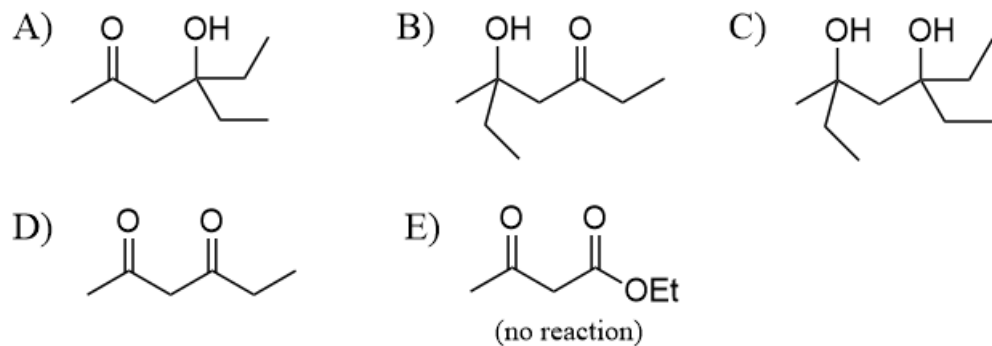
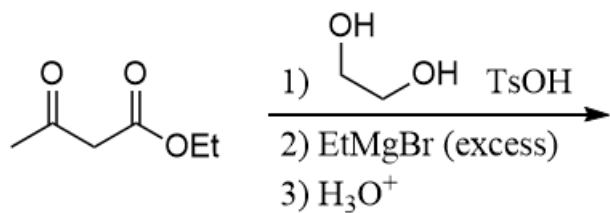
Step 2

- A) $\text{Na}_2\text{Cr}_2\text{O}_7, \text{H}_2\text{SO}_4$
- B) $\text{Na}_2\text{Cr}_2\text{O}_7, \text{H}_2\text{SO}_4$
- C) 1) PBr_3
2) Mg
3) CO_2 (+ aq. workup)
- D) 1) PBr_3
2) Mg
3) CO_2 (+ aq. workup)
- E) 1) TMSCl , pyridine
2) NaCN
3) H_3O^+ , heat

- 1) LiAlH_4 (+ aq. workup)
2) NH_3 (xs)
- 1) NH_3 (xs)
2) LiAlH_4 (+ aq. workup)
- 1) SOCl_2 , pyridine
2) NH_3 (xs)
3) LiAlH_4 (+ aq. workup)
- 1) LiAlH_4 (+ aq. workup)
2) NH_3 (xs)
- 1) SOCl_2 , pyridine
2) NH_3 (xs)
3) LiAlH_4 (+ aq. workup)

7

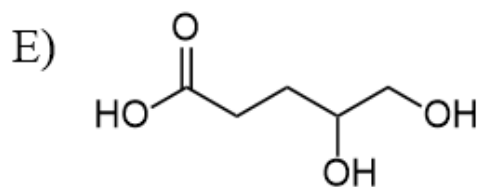
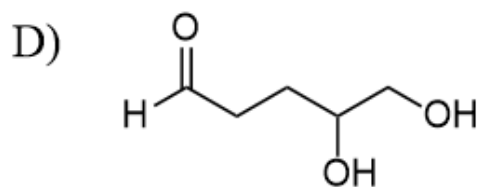
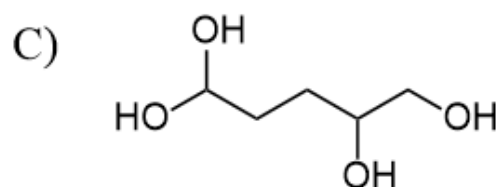
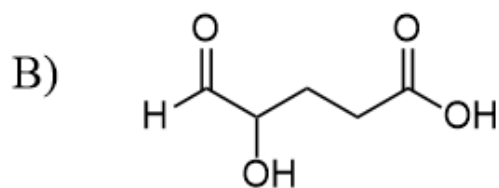
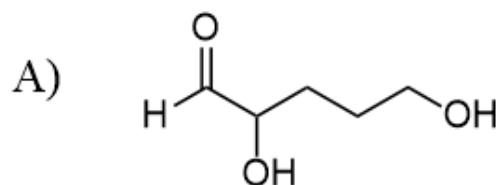
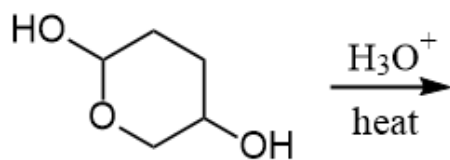
Predict the major product.



- A) ethoxy butanoic anhydride
 B) ethoxy 1,3-butanedioate
 C) ethyl 3-oxobutanoate
 D) ethyl 3-ketobutanoate
 E) 1-ethoxy-1,3-butanedione

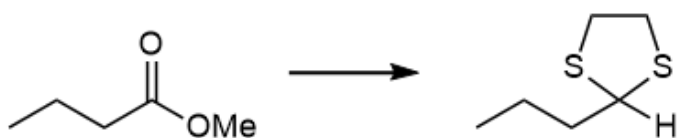
Predict the major product for the following reaction.

8



Provide the necessary reagents.

9



A) 1) LiAlH₄; workup
2) Na₂Cr₂O₇, H₂SO₄

3) HS-CH₂-CH₂-SH + H⁺

B) 1) LiAlH₄; workup
2) PCC

3) HS-CH₂-CH₂-SH + H⁺

C) 1) HS-CH₂-CH₂-SH + H⁺
2) LiAlH₄; workup

D) 1) LiAlH₄; workup

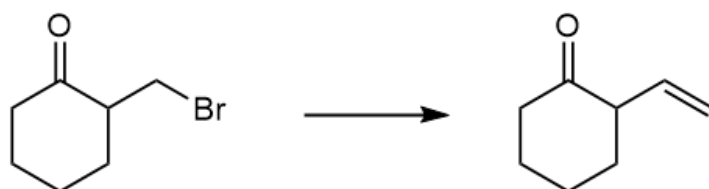
2) HS-CH₂-CH₂-SH + H⁺

E) 1) NaBH₄; workup

2) HS-CH₂-CH₂-SH + H⁺

10

Provide the necessary reagents.

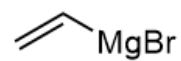


A) 1) HC≡CNa
2) H₂, Pd

D) 1) NaOH
2) PCC
3) Ph₃P=CH₂

B) 1) HC≡CNa
2) H₂, Lindlar's

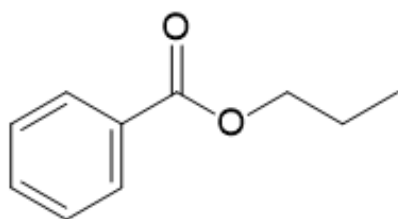
E) 1) HO-CH₂-CH₂-OH + TsOH

C) 1)  MgBr
2) H₃O⁺

2) PPh₃, then BuLi
3) O=CH₂
4) H₃O⁺

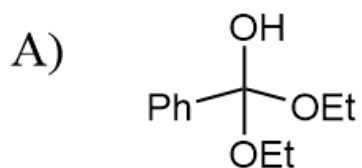
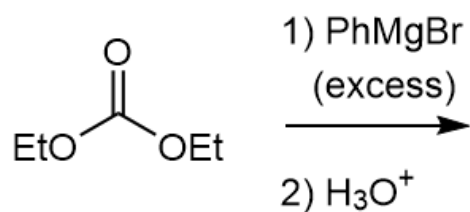
11

According to IUPAC rules, what is the name of the molecule shown?

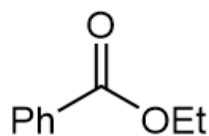


- A) Benzyl propanoate
- B) Phenyl propanoate
- C) Phenyl butanoate
- D) Propanoyl benzene
- E) Propyl benzoate

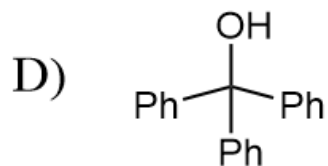
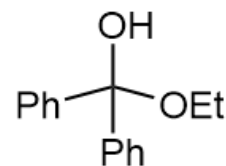
12 Predict the major product.



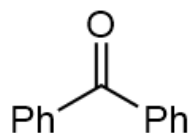
B)



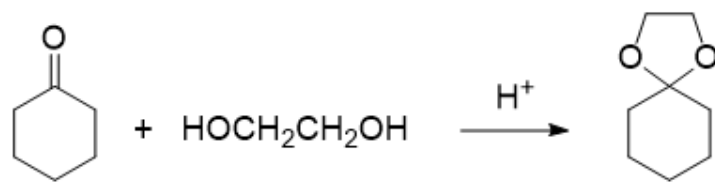
C)



E)



13



Which of the following is the hemiacetal intermediate in the reaction shown above?

