
HL Paper 1

Which would be the most effective method to distinguish between liquid propan-1-ol and propan-2-ol?

- A. Observation of colour change when warmed with acidified potassium dichromate
 - B. Determination of m/z value of molecular ion in the mass spectrum
 - C. Determination of percentage composition
 - D. ^1H NMR spectroscopy
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What structural feature must a molecule have in order to undergo addition polymerization?

- A. Two functional groups
 - B. A carbon–carbon double bond
 - C. Carbon atoms singly bonded together
 - D. A polar covalent bond
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What is the organic product of the reaction between butan-1-ol and ethanoic acid on heating using concentrated sulfuric acid?

- A. Butyl methanoate
 - B. Butyl ethanoate
 - C. Ethyl butanoate
 - D. Ethyl propanoate
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Which reaction occurs via a free-radical mechanism?

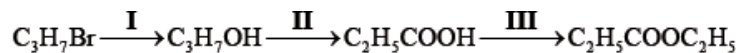
- A. $\text{C}_2\text{H}_6 + \text{Br}_2 \rightarrow \text{C}_2\text{H}_5\text{Br} + \text{HBr}$
 - B. $\text{C}_2\text{H}_4 + \text{Br}_2 \rightarrow \text{C}_2\text{H}_4\text{Br}_2$
 - C. $\text{C}_4\text{H}_9\text{I} + \text{OH}^- \rightarrow \text{C}_4\text{H}_9\text{OH} + \text{I}^-$
 - D. $(\text{CH}_3)_3\text{CI} + \text{H}_2\text{O} \rightarrow (\text{CH}_3)_3\text{COH} + \text{HI}$
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What is the name of $(\text{CH}_3)_2\text{CHCOCH}_3$ applying IUPAC rules?

- A. 3,3-dimethylpropan-2-one

- B. 3-methylbutan-2-one
- C. 2-methylbutan-3-one
- D. 3-methylbutanal
-

What is the correct order of reaction types in the following sequence?



	I	II	III
A.	substitution	oxidation	condensation
B.	addition	substitution	condensation
C.	oxidation	substitution	condensation
D.	substitution	oxidation	substitution

Which compound is produced in the reaction between but-2-ene and steam?

- A. $\text{CH}_3\text{CHOHCHOHCH}_3$
- B. $\text{CH}_2\text{OHCH}_2\text{CH}_2\text{CH}_2\text{OH}$
- C. $\text{CH}_3\text{CH}_2\text{CHOHCH}_3$
- D. $\text{CH}_3\text{CH}_2\text{CH}_2\text{CH}_2\text{OH}$
-

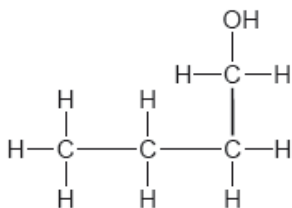
Which compounds can be reduced?

- I. C_2H_4
- II. CH_3COOH
- III. CH_3CHO

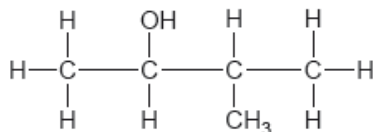
- A. I and II only
- B. I and III only
- C. II and III only
- D. I, II and III
-

Which is a secondary alcohol?

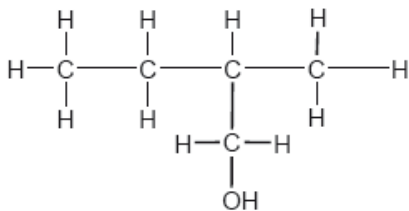
A.



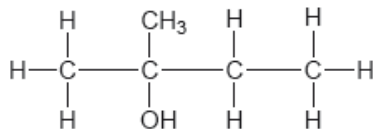
B.



C.



D.



What is the IUPAC name of the compound $\text{CH}_3\text{CH}_2\text{COOCH}_2\text{CH}_3$?

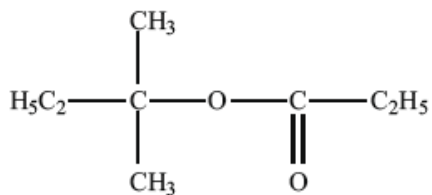
- A. Ethyl ethanoate
- B. Propyl ethanoate
- C. Ethyl propanoate
- D. Pentyl propanoate

Which functional groups are present in $\text{C}_6\text{H}_5\text{CONHC}_6\text{H}_5$?

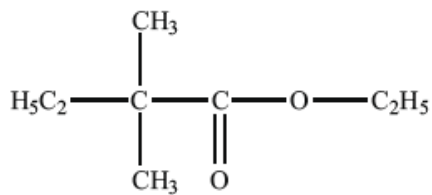
- A. Benzene ring (phenyl), amine
- B. Benzene ring (phenyl), ketone, amine
- C. Benzene ring (phenyl), amide
- D. Alkene, amide

What is the structural formula of the ester formed by reacting propanoic acid with 2-methylbutan-2-ol under appropriate conditions?

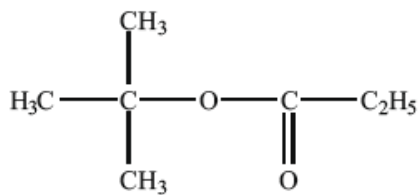
A.



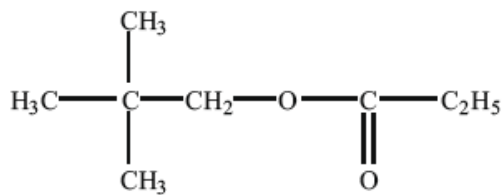
B.



C.



D.



What is the name of $(\text{CH}_3)_3\text{CCOCH}_3$, applying IUPAC rules?

- A. 2,2-dimethylbutan-3-one
 - B. 3,3-dimethylbutan-2-one
 - C. 2,2-dimethylbutanal
 - D. 3,3-dimethylbutanal
-

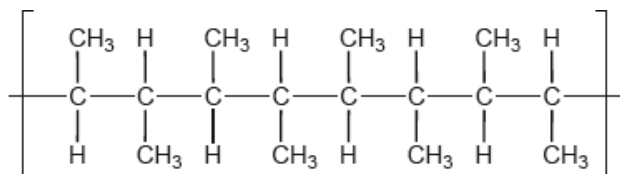
Which compound is the major product of the reaction when 1-bromobutane is heated with concentrated sodium hydroxide in ethanol?

- A. $\text{CH}_3\text{CHOHCH}_2\text{CH}_3$
 - B. $\text{CH}_3\text{CHCHCH}_3$
 - C. $\text{CH}_3\text{CH}_2\text{CH}_2\text{CH}_2\text{OH}$
 - D. $\text{CH}_2\text{CHCH}_2\text{CH}_3$
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What is the IUPAC name for $\text{HCOOCH}_2\text{CH}_2\text{CH}_3$?

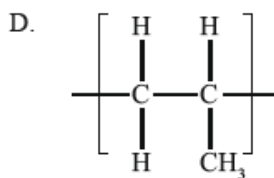
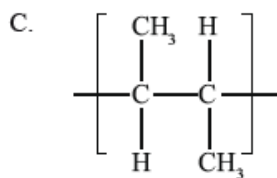
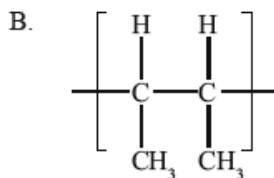
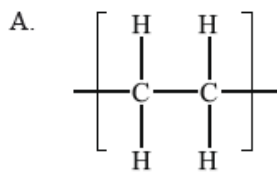
- A. Butanoic acid
 - B. Butanal
 - C. Methyl propanoate
 - D. Propyl methanoate
-

Which monomer could create this polymer?



- A. But-2-ene
 - B. But-1-ene
 - C. Propene
 - D. 2-Methylprop-1-ene
-

Which of these repeating units is present in the polymer poly(propene)?



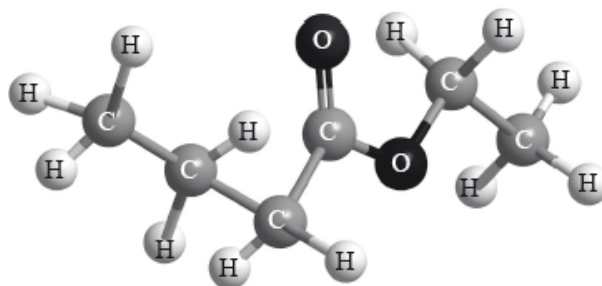
What is the IUPAC name for $(\text{CH}_3)_2\text{COH}(\text{CH}_2)_2\text{CH}_3$?

- A. Hexan-3-ol
- B. 2-methylpentan-2-ol
- C. 2-methylpentan-3-ol
- D. Dimethylpentan-1-ol

Which product is formed when bromine water is added to propene, CH_3CHCH_2 ?

- A. $\text{CH}_3\text{CBr}_2\text{CH}_3$
- B. $\text{CH}_2\text{BrCH}_2\text{CH}_2\text{Br}$
- C. $\text{CH}_3\text{CHBrCH}_2\text{Br}$
- D. $\text{CH}_3\text{CH}_2\text{CH}_2\text{Br}$

Which reactants could be used to form the compound below?



- A. Butanoic acid and ethanol
- B. Propanoic acid and ethanol
- C. Ethanoic acid and propan-1-ol
- D. Ethanoic acid and butan-1-ol

Which compound is an amide?

- A. $\text{CH}_3\text{COOCH}_3$
 - B. CH_3CONH_2
 - C. CH_3NH_2
 - D. $\text{CH}_2(\text{NH}_2)\text{COOH}$
-

What is the name of the ester formed when $\text{CH}_3\text{CH}_2\text{COOH}$ and CH_3OH react together?

- A. Ethyl methanoate
 - B. Methyl ethanoate
 - C. Propyl methanoate
 - D. Methyl propanoate
-

What is the product of the addition of chlorine, Cl_2 , to propene, C_3H_6 ?

- A. 1,1-dichloropropane
 - B. 2,2-dichloropropane
 - C. 1,2-dichloropropane
 - D. 1,3-dichloropropane
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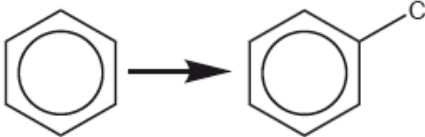
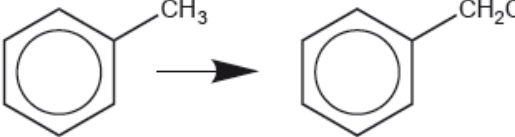
Identify the functional group present in $\text{HCOCH}_2\text{CH}_3$.

- A. Ester
 - B. Ketone
 - C. Aldehyde
 - D. Alcohol
-

What are possible products of the incomplete combustion of propan-2-ol?

- A. carbon monoxide, hydrogen and carbon
 - B. carbon dioxide, carbon and hydrogen
 - C. carbon, carbon monoxide and water
 - D. carbon dioxide and water only
-

Which is the correct combination of substitution reaction mechanisms?

 <p>reaction mechanism</p>	 <p>reaction mechanism</p>
A. electrophilic	free radical
B. nucleophilic	nucleophilic
C. free radical	electrophilic
D. free radical	nucleophilic

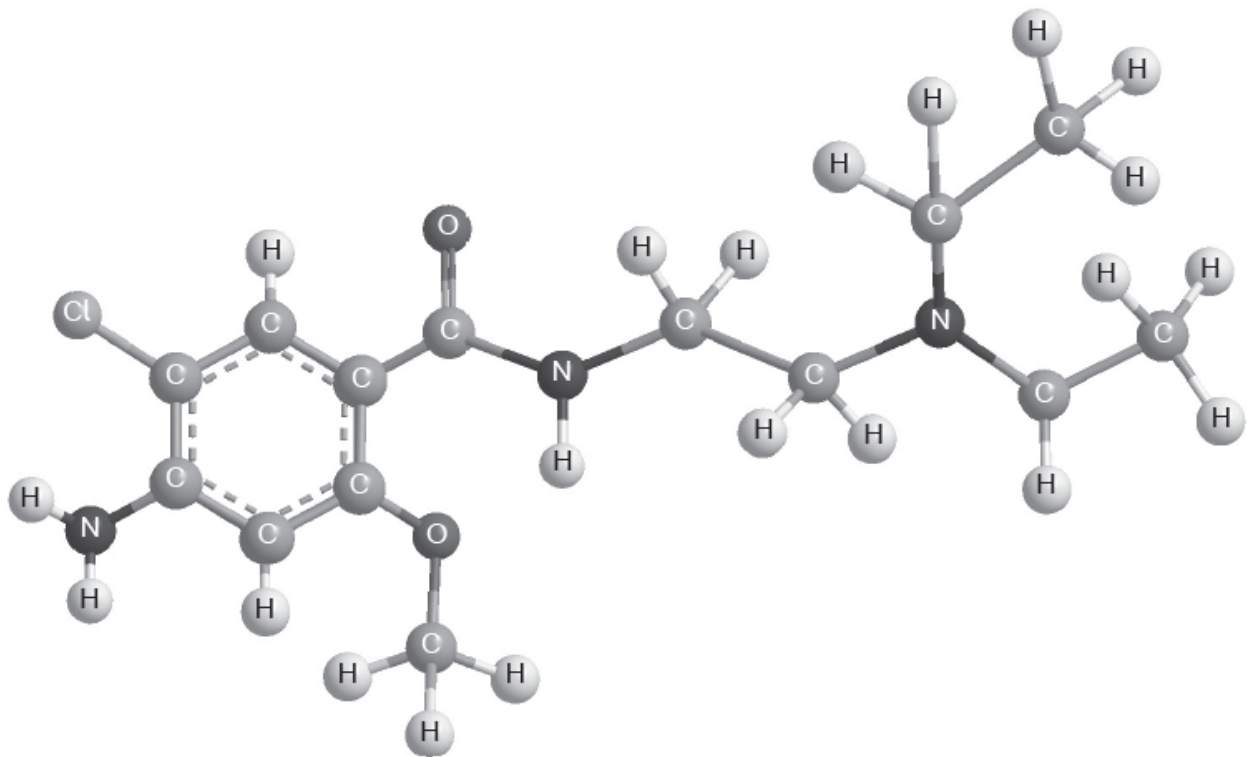
In which order should the reagents be used to convert benzene into phenylamine (aniline)?

	1st reagent	2nd reagent	3rd reagent
A.	NaOH	Sn / conc. HCl	conc. HNO ₃ / conc. H ₂ SO ₄
B.	Sn / conc. HCl	NaOH	conc. HNO ₃ / conc. H ₂ SO ₄
C.	conc. HNO ₃ / conc. H ₂ SO ₄	Sn / conc. HCl	NaOH
D.	NaOH	conc. HNO ₃ / conc. H ₂ SO ₄	Sn / conc. HCl

What is the major product of the reaction between 2-methylbut-2-ene and hydrogen bromide?

- A. 3-bromo-2-methylbutane
- B. 3-bromo-3-methylbutane
- C. 2-bromo-3-methylbutane
- D. 2-bromo-2-methylbutane

Which functional group is responsible for the pK_b of 4.1 in this compound?



- A. Amido
- B. Amino
- C. Chloro
- D. Ether