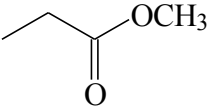
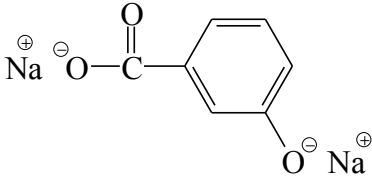
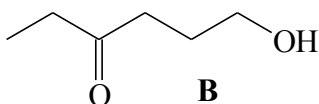
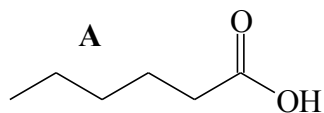


- Complete the following table.

Marks
7

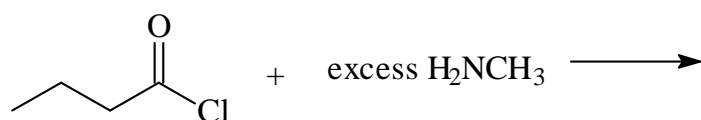
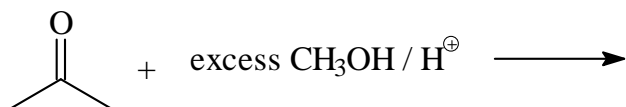
STARTING MATERIAL	REAGENT/CONDITIONS	CONSTITUTIONAL FORMULA(S) OF MAJOR ORGANIC PRODUCT(S)
	excess $\text{CH}_3\text{CH}_2\text{NH}_2$	
	dilute NaOH	

- How would you distinguish between the following pairs of molecules by means of a simple chemical test? In each case, indicate what reagent would be added and any physical change observed. Write an equation for any reaction that occurs. Specify if no reaction occurs by writing "N.R."



- Draw the constitutional formula(s) of the major organic product(s) of the following reactions.

Marks
3

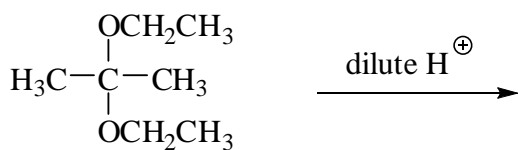
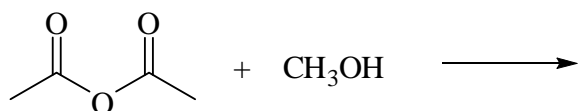
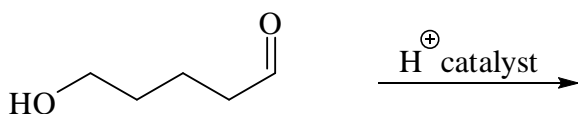


- Benzoic acid has a low solubility in water at pH 7, but is very soluble in aqueous solutions of greater pH. Explain this observation, using chemical equations where appropriate.

2

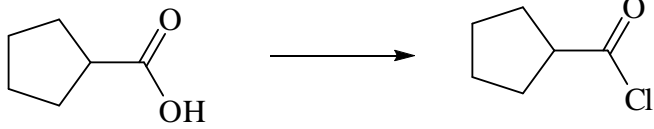
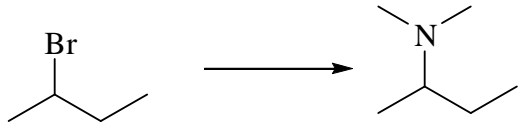
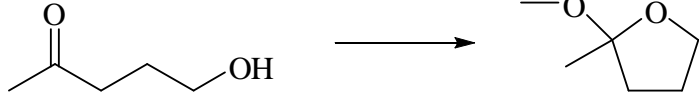
- Draw the constitutional formula(s) of the major organic product(s) of the following reactions.

7



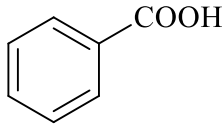
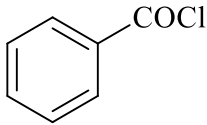
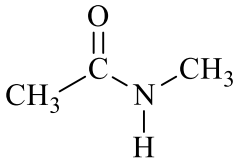
- Indicate the reagents used in the laboratory to effect the following transformations.

3

Reaction	Reagent
 <p>The reaction shows cyclopentanecarboxylic acid (a five-membered ring with a -COOH group) reacting to form cyclopentanecarbonyl chloride (a five-membered ring with a -COCl group).</p>	
 <p>The reaction shows 2-bromobutane (a four-carbon chain with a bromine atom on the second carbon) reacting to form N,N-dimethylbutan-2-amine (a four-carbon chain with a nitrogen atom on the second carbon, bonded to two methyl groups).</p>	
 <p>The reaction shows 4-hydroxybutan-2-one (a four-carbon chain with a ketone group at C2 and a hydroxyl group at C4) reacting to form 2-methyltetrahydrofuran (a five-membered ring with an oxygen atom and a methyl group on the carbon adjacent to the oxygen).</p>	

Marks
4

• Complete the following table.

Starting material	Reagent / Conditions	Major organic products(s)
		
$\text{CH}_3\text{CH}_2\text{COOCH}_2\text{CH}_3$	2 M NaOH heat	
	NH_2CH_3	 + $\text{CH}_3\text{CH}_2\text{OH}$

THE REMAINDER OF THIS PAGE IS FOR ROUGH WORKING ONLY.

Marks
3

- Show clearly the reagents you would use to carry out the following chemical conversions. Note that more than one step is required and you should indicate all necessary steps and the constitutional formulas of any intermediate compounds.

