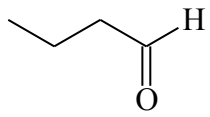
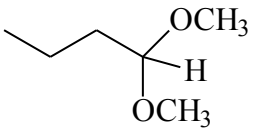
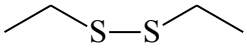
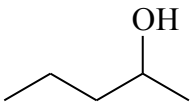
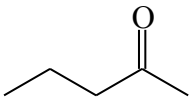
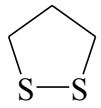
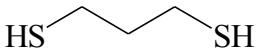
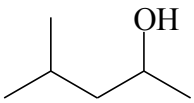
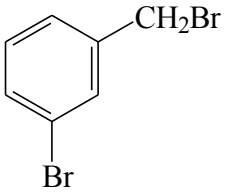
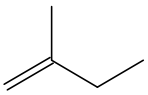
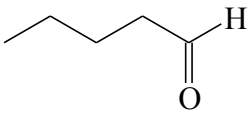
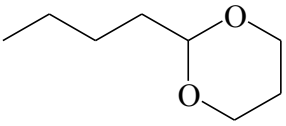
Marks 13

- Complete the following table.

STARTING MATERIAL NAME (where required)	REAGENTS/ CONDITIONS	CONSTITUTIONAL FORMULA(S) OF MAJOR ORGANIC PRODUCT(S)
		
	Zn / dilute HCl	
		

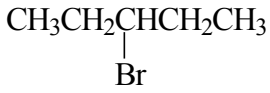
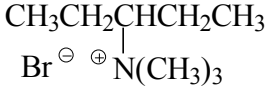
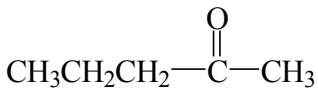
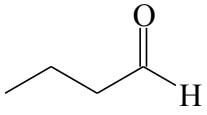
- Complete the following table. Make sure you complete the name of the starting material where indicated.

Marks 13

STARTING MATERIAL NAME (where required)	REAGENTS/ CONDITIONS	CONSTITUTIONAL FORMULA(S) OF MAJOR ORGANIC PRODUCT(S)
		
 **Name:**	$H^{\oplus}$/ $Cr_2O_7^{2\ominus}$	
	$K^{\oplus}\,{}^{\ominus}CN$	
 **Name:**	Cl_2 / CCl_4(solvent)	
 **Name:**		

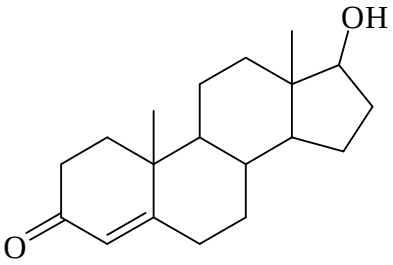
- Complete the following table. Make sure you complete the name of the starting material where indicated.

Marks 5

STARTING MATERIAL NAME (where required)	REAGENTS/ CONDITIONS	CONSTITUTIONAL FORMULA(S) OF MAJOR ORGANIC PRODUCT(S)
 **Name:**		
 **Name:**	1. $LiAlH_4$ / dry ether 2. $H^{\oplus}$ / H_2O	
	$[Ag(NH_3)_2]^{\oplus}$ / dil. $OH^{\ominus}$	

Marks 8

The structure of testosterone, an important male hormone, is shown below.



testosterone

Give the molecular formula of testosterone.

Identify the functional groups present in testosterone.

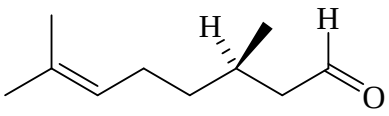
How many stereogenic (chiral) centres are there in testosterone?

Draw the constitutional formula of the product formed when testosterone is treated with the following reagents.

excess methanol / HCl	$LiAlH_4$ in dry ether; then $H^{\oplus}$ / H_2O
concentrated H_2SO_4 / heat	H_2 / Pd catalyst

Marks 5

- (+)-Citronellal is a widely occurring natural product present in citronella oil, lemon and lemon grass. It is used as a soap perfume and in insect repellents.



citronellal

Give the molecular formula of citronellal.

Identify the functional groups present in citronellal.

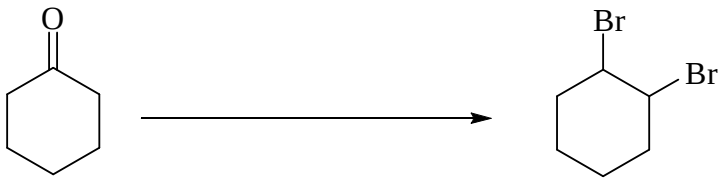
Draw the constitutional formula of the product(s) formed when citronellal is treated with each of the following reagents.

$Cr_2O_7^{2\ominus}$ / $H^{\oplus}$	
3 M H_2SO_4	
excess CH_3OH / catalytic amount H_2SO_4	

THE REMAINDER OF THIS PAGE IS FOR ROUGH WORKING ONLY.

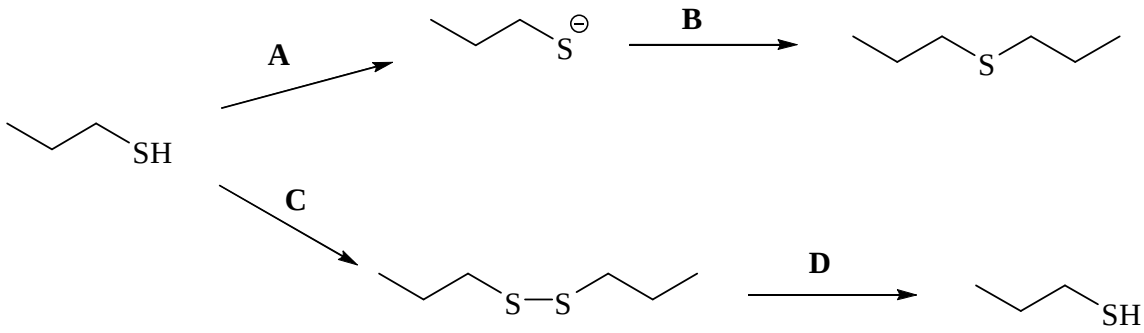
- Devise a synthesis of 1,2-dibromocyclohexane from cyclohexanone. Note that more than one step is required and you should indicate all necessary steps and the constitutional formulas of any intermediate compounds.

Marks
3



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

4



A:

B:

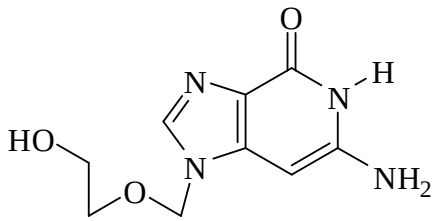
C:

Provide a description for transformation **B**.

Provide a description for transformation **D**.

Marks 4

- Acyclovir is an analogue of the nucleoside guanosine, and is used clinically as an antiviral agent.



acyclovir

Hydrolysis of acyclovir gives the nucleic base guanine, a diol and a carbonyl compound. Give the structures of guanine, a tautomer of guanine, and the diol and carbonyl compounds formed.

guanine	tautomer of guanine
the diol	the carbonyl compound

THE REMAINDER OF THIS PAGE IS FOR ROUGH WORKING ONLY.

Marks 6

- 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.