No. :

Date :

Organic Chemistry Reaction Mechanism

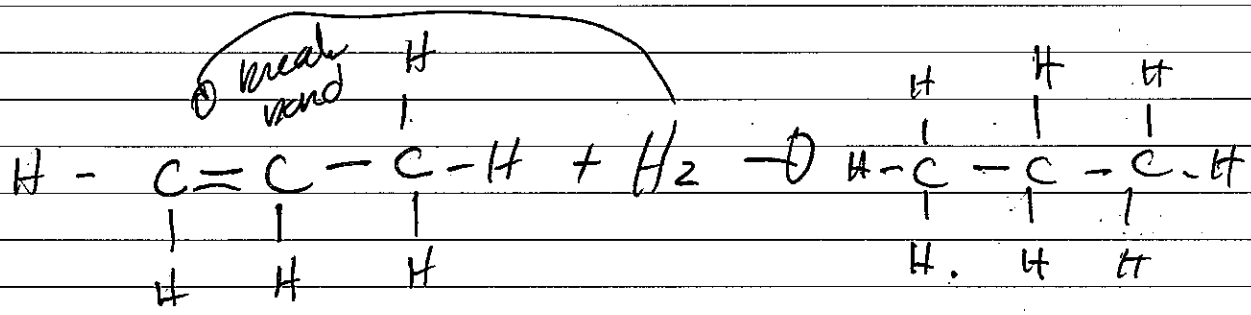
$CH_4 + Cl_2 \rightarrow CH_3Cl + HCl$.

1.1 $CH_3Cl + Cl_2 \rightarrow CH_2Cl_2 + HCl$

~~$CH_2Cl_2 + Cl_2 \rightarrow CHCl_3$~~

$CH_2Cl_2 + Cl_2 \rightarrow CHCl_3 + HCl$.

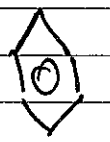
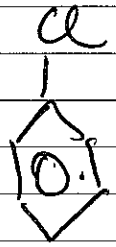
1.2.



hydrogen propane.

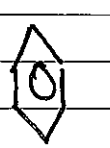
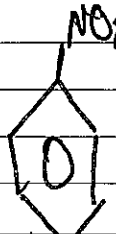
Reaction: hydrogenation reaction.

1.3.

(A)  + Cl_2 →  + HCl.

benzene Chlorine Chloro benzene. hydrogen chloride

Substitution.

B).  + HNO_3 →  + H_2O

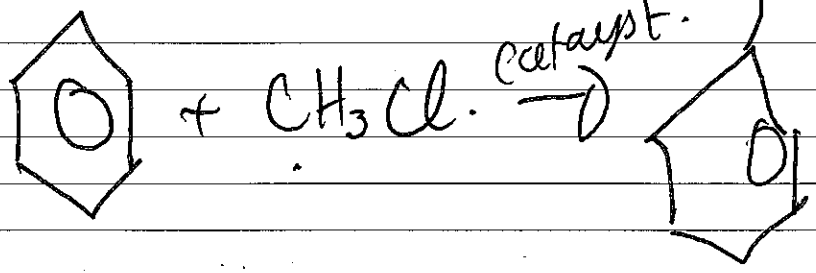
Substitution

benzene nitric acid nitrobenzene water.

No. :

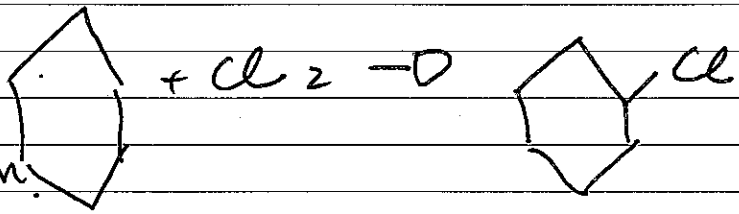
Date :

c).



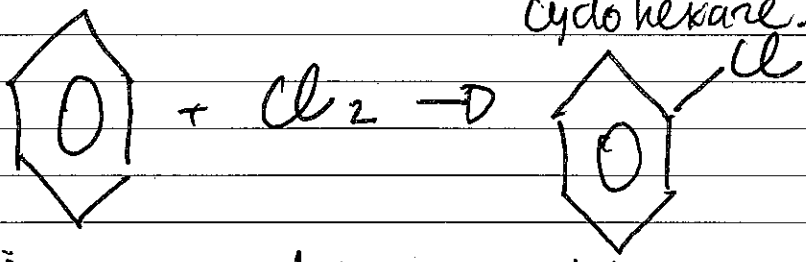
Substitution reaction. benzene. Chloro methane. methyl benzene + HCl hydrogen Chloride.

d).



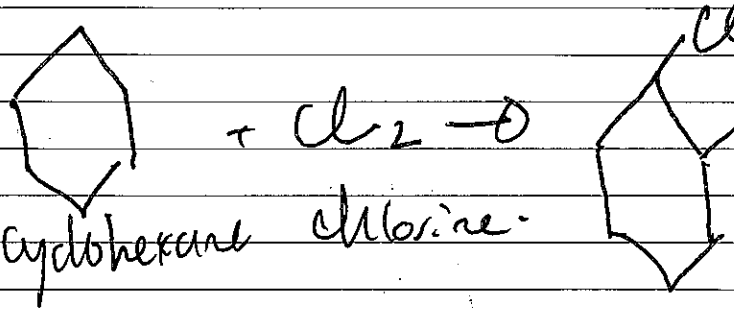
Substitution reaction. cyclo hexane. Chloro ~~benzene~~ cyclohexane. hydrogen chloride.

e)



Substitution reaction benzene chlorine chloro benzene hydrogen chloride.

f).

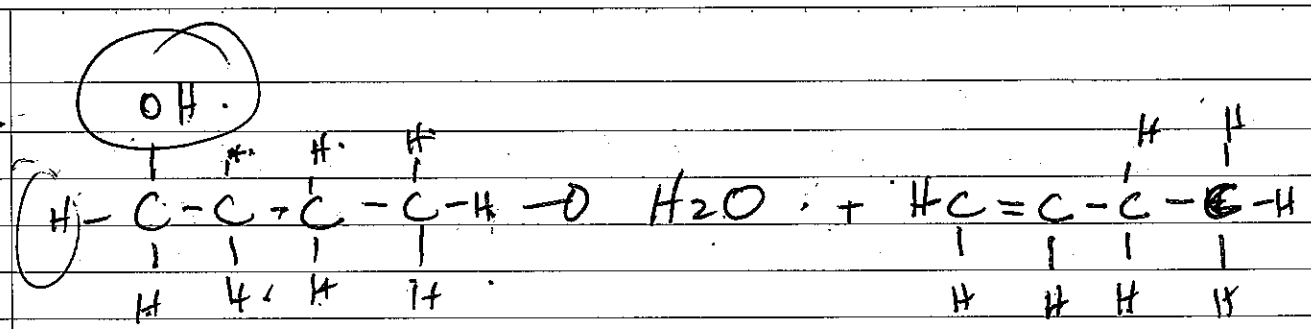


Addition Reaction. cyclohexane chlorine. dichloro benzene.

No. :

Date :

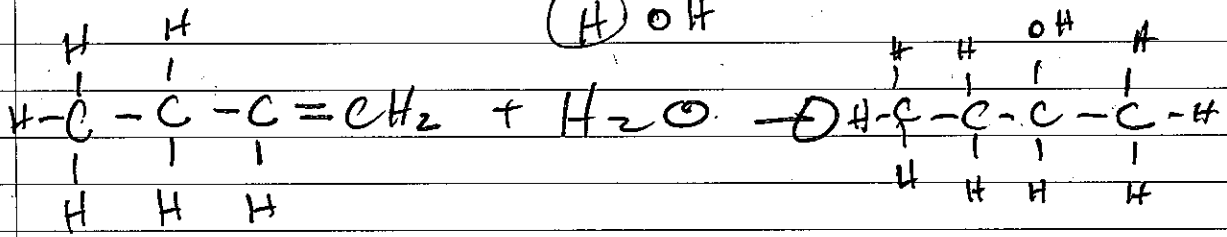
1.4.



butan-1-ol water but-1-ene

P. 37, #1 + 2. (1.4). markinkov's rule.

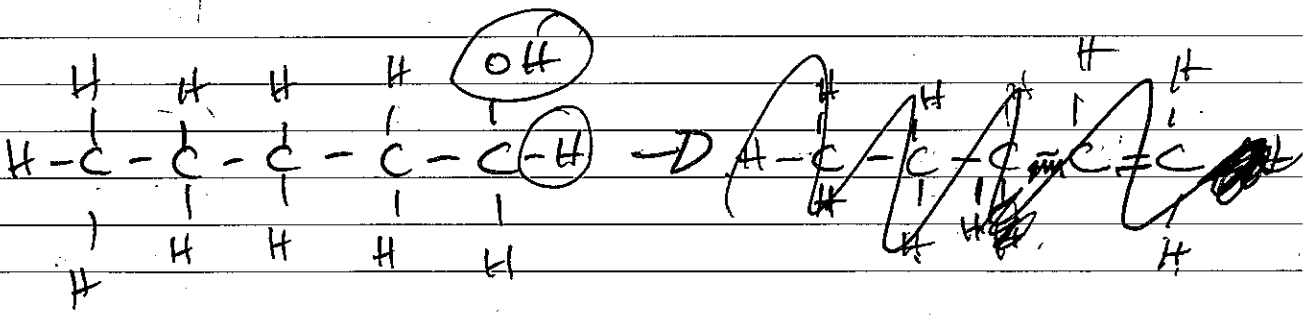
1.



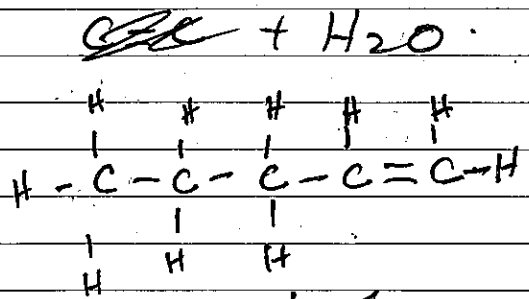
but-1-ene. butan-2-ol.

Addition Reaction:

#2).



pentan-1-ol.

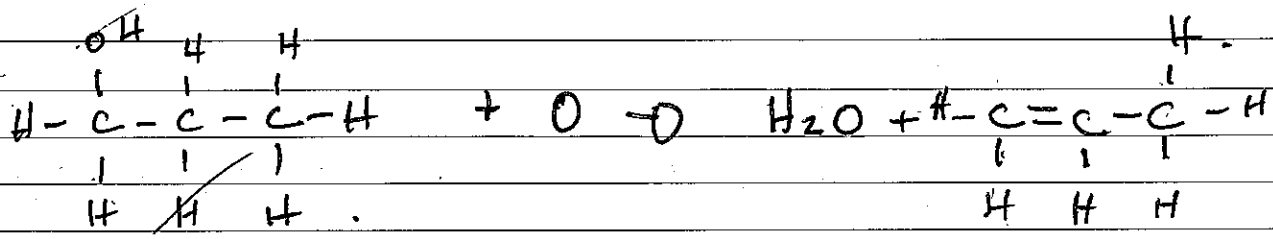


pent-1-ene.

No. :

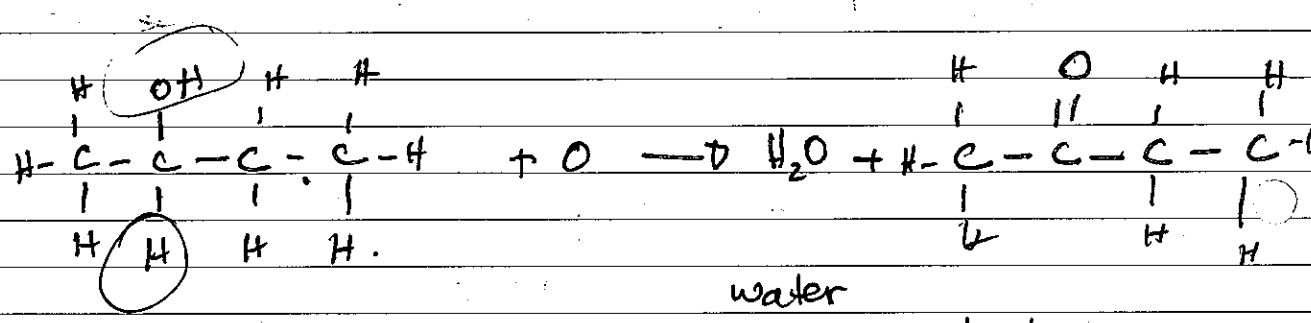
Date :

1.5



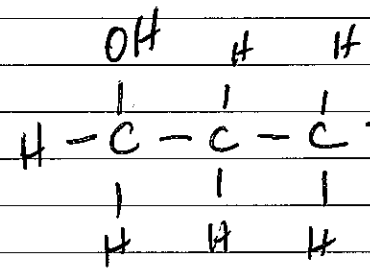
propan-1-ol. propan-1-ene.

1.5.

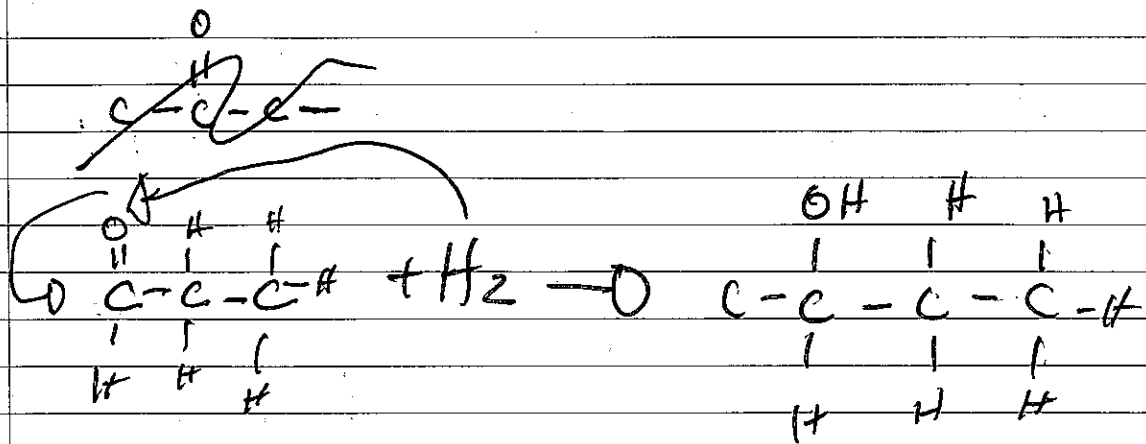


water

butan-2-ol butan one.



1.5.



propanal hydrogen

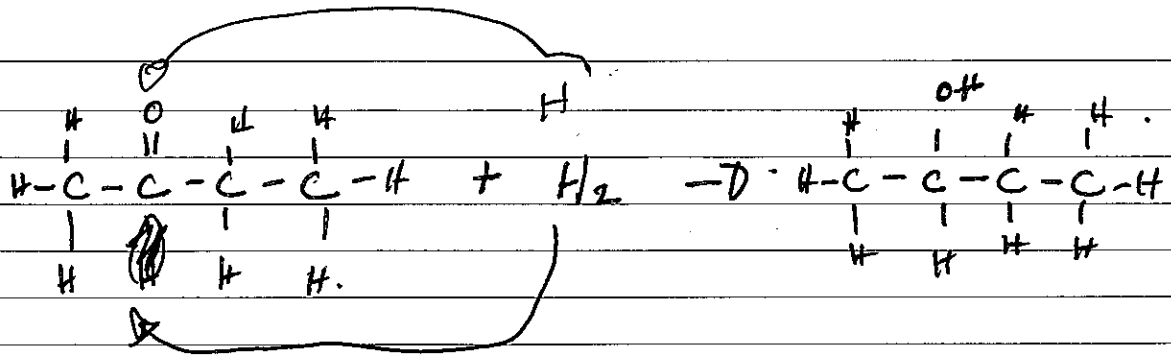
Reaction: hydrogenation reaction.

propan-1-ol.

No. :

Date :

1.5

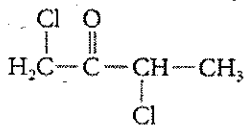


butan-2-one.

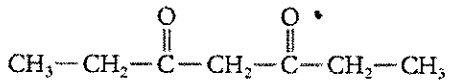
butan-2-ol

p. 45, #1-3.

(b) First, draw the carbon chain for the parent alkane: butane. Then, draw the carbonyl group attached to the appropriate carbon atom. Next, add the other substituent groups—two chlorine atoms—to their carbon atoms. Therefore, the structure of 1,3-dichlorobutan-2-one is

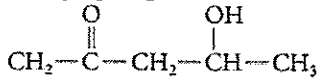


(c) First, draw the carbon chain for the parent alkane: heptane. Then, draw the carbonyl groups attached to the appropriate carbon atoms. Therefore, the structure of heptane-3,5-dione is



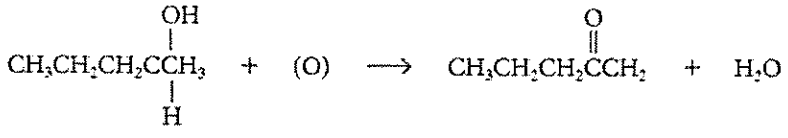
(d) First, draw the carbon chain for the parent alkane: cyclobutane. Then, draw the carbonyl group attached to the appropriate carbon atom. If there is one carbonyl group, it can be attached to any carbon atom. Therefore, the structure of cyclobutanone is

(e) First, draw the carbon chain for the parent alkane: pentane. Then, draw the carbonyl group attached to the appropriate carbon atom. Next, add the substituent group—hydroxyl group—to its carbon atom. Therefore, the structure of 4-hydroxypentan-2-one is



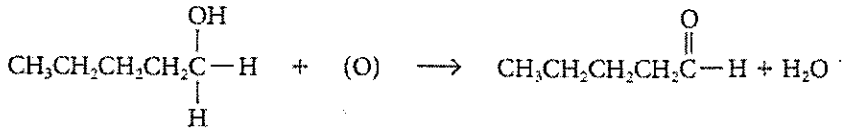
Tutorial 3 Practice, page 45

1. (a) Pentan-2-one can be formed by the controlled oxidation of pentan-2-ol. To prepare pentanone, pentan-2-ol would need to react with oxygen. The structural formulas are as follows:



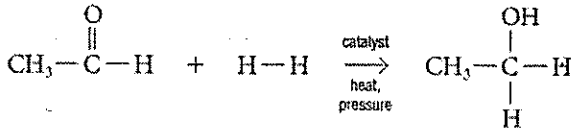
pentan-2-ol pentan-2-one

(b) Pentanal can be formed by the controlled oxidation of pentan-1-ol. To prepare pentanal, pentan-1-ol would need to react with oxygen. The structural formulas are as follows:



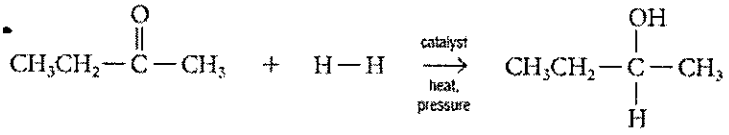
pentan-1-ol pentanal

2. (a) Ethanal is an aldehyde. The hydrogenation of an aldehyde produces a primary alcohol. Therefore, the hydrogenation of ethanal will produce ethanol. The structural formulas are as follows:



ethanal ethanol

(b) Butanone is a ketone. The hydrogenation of a ketone produces a secondary alcohol. Therefore, the hydrogenation of butanone will produce butan-2-ol. The structural formulas are as follows:

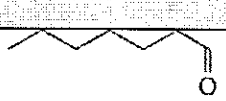
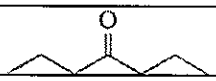
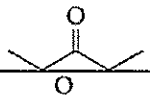
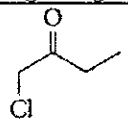
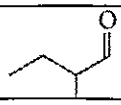


butanone butan-2-ol

3. (a) The products of the controlled oxidation of hexan-1-ol are hexanal and water.
(b) The products of the controlled oxidation of hexan-2-ol are hexan-2-one and water.
(c) The products of the controlled oxidation of 2-methylpentan-2-ol are 2-methylpentan-2-one and water.

Section 1.5 Questions, page 46

1. Table 1

Name	Condensed structure	Line diagram or structural formula	Type of compound
heptanal	$CH_3CH_2CH_2CH_2CH_2CH_2CHO$		aldehyde
heptan-4-one	$CH_3CH_2CH_2COCH_2CH_2CH_3$		ketone
pentan-3-one	$CH_3CH_2COCH_2CH_3$		ketone
1-chlorobutan-2-one	$CH_2ClCOCH_2CH_3$		ketone
3-methylpentanal	$CH_3CH_2CH(CH_3)CH_2CHO$		aldehyde
2-methylbutanal	$CH_3CH_2CH(CH_3)CHO$		aldehyde